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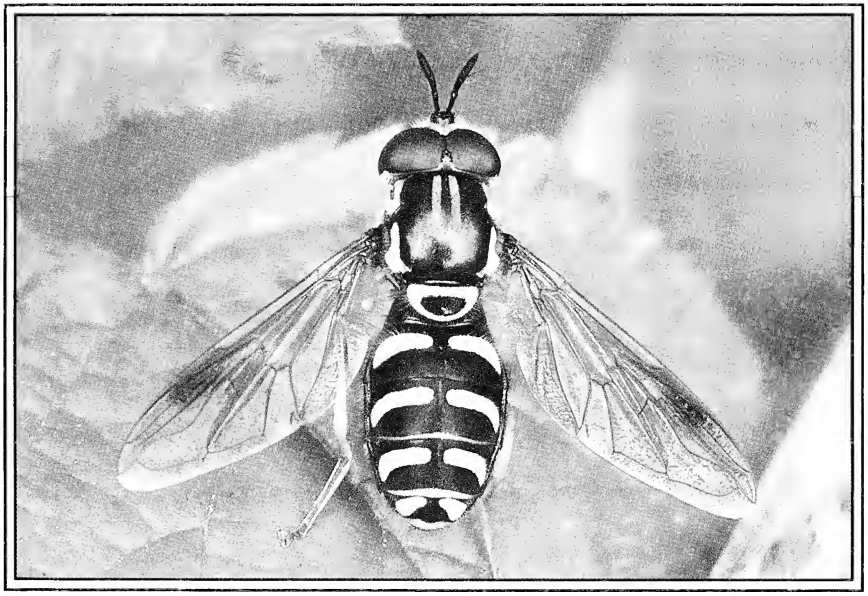

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COLEOPTERA FOUND IN WRACK BEDS AND STRANDLINES AROUND THE KENT COAST

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ABSTRACT

Coleoptera were collected from marine strandlines around Kent by hand searching and extraction sampling. On average, extracting beetles from wrack material (2 litre) by flotation resulted in three times as many specimens as a standard ten minute hand-search. Beetles were most abundant and species-rich during the summer (June–August), although some species were still active in December and January. In total, 402 individuals were collected, belonging to 54 species in 13 families. Most of the species recorded are common in the UK, although many (*e.g. Cercyon littoralis* (Gryllenhal), *Cafius xantholoma* (Gravenhorst) and *Aleochara obscurella* Gravenhorst) are specialized to the strandline habitat. The Nationally Scarce species *Licinus depressus* (Paykull) (Carabidae) and *Aleochara verna* Say (Staphylinidae) were recorded. A specimen of *Myrmecopora oweni* Assing (Staphylinidae) was found at Dungeness and likely represents the first record of this species in Kent. The strandlines found on sandy beaches contained more individuals and species than those on shingle shores, possibly because the wrack on shingle was prone to rapid desiccation. There appeared a geographic split in the composition of the beetle assemblages found on the south and north coasts, primarily because most of the southern sites visited in the survey had shingle beaches and thus low yields of beetles.

INTRODUCTION

Wrack beds consist of accumulations of loose seaweed washed up on shore, and can range from substantial masses of material, tens of metres long and metres deep, to the more often seen strandlines or 'wrack strings' (Egglishaw, 1965). When wrack beds are formed beyond the reach of subsequent tides they can remain in place for several days (and even weeks) and are then colonized by a number of arthropod detritivores and their associated predators and parasites. Numerous species of Coleoptera are found in the marine littoral habitat and many occur on these allochthonous deposits of marine debris (Doyen, 1976; Moore & Legner, 1976; Hammond, 2000). Backlund (1945) and Egglishaw (1965) gave lists of Coleoptera found amongst wrack beds in Scandinavia and north-east England respectively and Walsh (1925) described the British coastal beetles associated with seaweed and 'marine rejectamenta' (see also Walsh & Cooter, 2006). Previous ecological studies have examined the temporal patterns in species colonization and the spatial distribution of beetles within large wrack beds (Lavoie, 1985; Inglis, 1989; Phillips & Arthur, 1994; Hodge & Jessop, 1996).

There are sometimes large quantities of non-organic debris and litter within strandlines that are unsightly and dangerous to wildlife, and decomposing wrack beds can be extremely malodorous and have been suspected of producing nuisance 'plagues' of kelp flies (see Oldroyd, 1954). Thus there can sometimes be pressure on civic authorities to remove strandlines from amenity beaches. However, with increased understanding of biodiversity issues there is a realization that strandlines

are an important component of coastal ecosystems (Llewellyn & Shackley, 1996; Anon., 1999; Whitehouse, 2005) and can provide a habitat for species of Coleoptera that are considered scarce or nationally rare (e.g. *Nebria complanata* (L.); see also Hodge & Jessop, 1996).

This paper describes a preliminary systematic survey of the beetles associated with wrack beds and strandlines around the coast of Kent. This county, with its proximity to mainland Europe, has an excellent record for containing some of Britain's rarest insect species, including many recent records of coastal Coleoptera new to the UK (e.g. Welch, 1990; Telfer, 2001, 2003). The survey aimed to obtain information on geographical and seasonal patterns in species abundance and compare the beetle assemblages found on sandy beaches with those on shingle shores.

Methods

The survey encompassed ten sites, from Dungeness in the south to Leysdown in the north, following the coastal boundary of East Kent Watsonian Vice-county 15 (Fig. 1). The sites were classified as having either a sandy (Sa), shingle (Sh) or mixed (Mix) beach and each was visited twelve times at approximately monthly intervals between January and December 2004. The sites were: Dungeness (TR094168; Sh), St

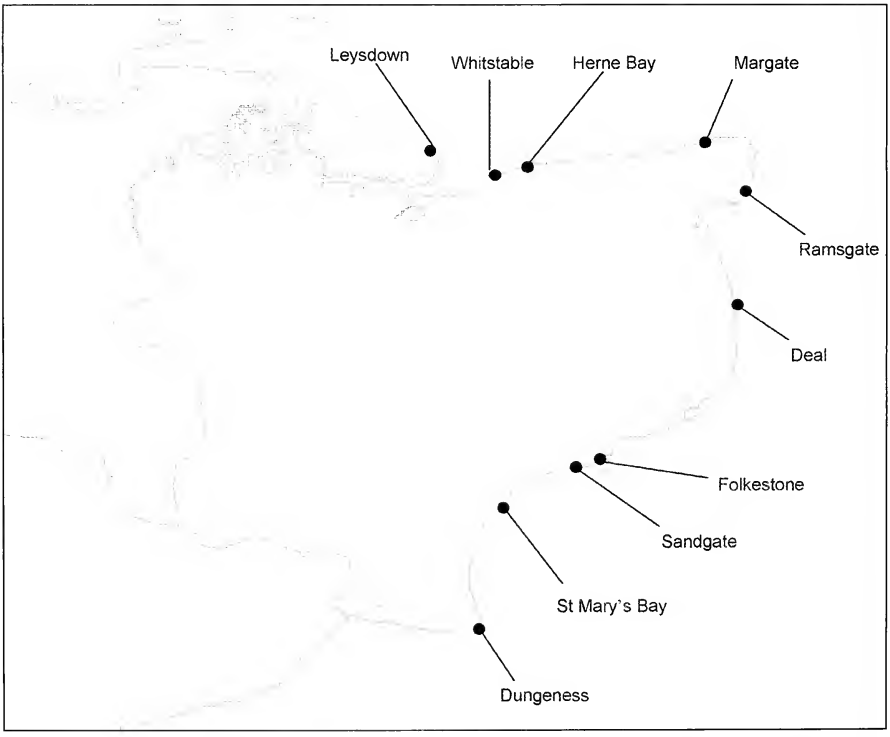

Fig. 1. Map of Kent showing the boundary of Watsonian Vice-county 15 and the locations of the ten sites used in the main survey [outline of map produced using MapMate software Release 2.1.6].

Mary's Bay (TR092275; Mix), Sandgate (TR198350; Sh), Folkestone (TR2326356; Sh), Deal (TR378518; Sh), Ramsgate (TR392655; Sa), Margate (TR349708; Sa), Herne Bay (TR171683; Sh), Whitstable (TR106669; Mix) and Leysdown (TR040701; Mix).

On each sampling visit two collecting methods were used. A standardized ten minute hand search was performed by sorting through the strandline and collecting beetles using a variety of techniques (e.g. glass tubes, forceps, battery-powered aspirators). The second method involved collecting a sample of material (~2 L) from the strandline (and immediate substrate) and returning with it to the laboratory in a plastic bag. Beetles were then extracted from the wrack by first sorting the material over a white tray and then plunging it into water to remove any further specimens by flotation. All specimens were stored in 75% ethanol to which a few drops of glycerol had been added and were determined to species within five months of the final sample being collected (by A.W.). Nomenclature follows that given in the checklists provided by *The Coleopterist* website (as of 7.xii.2006; www.coleopterist.org.uk).

On many occasions no strandline material was present at a site at the time of the sampling visit. When this occurred the beetle counts for both collecting methods were scored as zero.

A further thirteen samples of strandline beetles were collected on a more *ad hoc* basis from locations not used in the main study, or from primary sites on different dates from those of the main survey. The results of these samples are presented in Appendix 1 as they provide records of species not obtained in the main survey and some additional information on geographical distributions.

Results and Discussion

The fauna

A total of 402 beetles was collected in the main survey, comprising 54 species in 13 families (Table 1). Twenty-three of the 54 species were recorded as singletons and nearly half (45%) of the individuals and species were Staphylinidae. The thirteen *ad hoc* samples produced a further 68 individuals belonging to 20 species, six of which were not found in the main survey (see Appendix 1).

Many of the species collected are considered to be closely associated with coastal habitats and marine debris. Of the species recorded here, Walsh & Cooter (2006) list *Anthicus antherinus* (L.), *Cercyon littoralis* (Gyllenhal), *Corticaria crenulata* (Gyllenhal), *Aleochara grisea* Kraatz, *A. obscurella* Gravenhorst, *Atheta triangulum* (Kraatz), *Cafius xantholoma* (Gravenhorst), *Omalium laeviusculum* Gyllenhal, *Omalium riparium* Thomson and *Thinobaena vestita* (Gravenhorst) as being associated with decomposing seaweed. The carabids *Dicheirotrichus gustavii* Crotch and *Paradromius linearis* (Olivier) and the four species of *Bembidion* that were recorded (Table 1; Appendix 1) are also considered to be coastal in their habits, often occurring under tidal debris (Lindroth, 1974; Luff, 1998).

Most of the Staphylinidae collected predate on small insects, mites, dipteran larvae and other invertebrates that live in the wrack, although *Omalium* spp. tend to be mixed feeders, taking in detritus and associated micro-organisms (Hammond, 2000). The carabids recorded were also primarily predators (or scavengers), whilst *Amara familiaris* (Duftschmid) feeds on seeds and vegetable matter and might take some decomposing algal material (Lindroth, 1974; Luff, 2006). The strandline specialists *Cercyon littoralis* and *Cafius xantholoma* prey on dipteran larvae and adult flies, and it has been demonstrated that the latter species can exhibit a close spatial association with its prey within the wrack bed (Phillips & Arthur, 1994). *Aleochara* spp. typically

Table 1. Total numbers of Coleoptera collected from twelve site-visits using hand searching and extraction sampling techniques. [DG – Dungeness; SM – St Mary's Bay; SA – Sandgate; FK – Fokestone; DE – Deal; RA – Ramsgate; MA – Margate; HB – Herne Bay; WH – Whitstable; LN – Leysdown].

		DG	SM	SA	FK	DE	RA	MA	HB	WH	LN	Total
Anthicidae	*Anthicus antherinus* (L.)	–	–	–	–	–	–	–	–	–	3	3
Carabidae	*Amara familiaris* (Duftschmid)	–	3	–	–	–	–	–	–	–	1	4
	Bembidion lunulatum (Fourcroy)	–	–	–	–	–	–	–	–	–	1	1
	Bembidion minimum (Fabr.)	–	–	–	–	–	–	–	–	–	1	1
	Bembidion normannum Dejean	–	–	–	–	–	–	1	–	2	1	4
	Dicheirotrichus gustavii Crotch	–	–	–	–	–	1	–	–	–	–	1
	Notiophilus biguttatus (Fabr.)	–	–	–	–	–	–	–	–	1	–	1
	Paradromius linearis (Olivier)	–	–	–	–	–	–	–	–	–	1	1
	Trechus quadristriatus (Schrank)	–	31	–	–	–	1	4	1	3	–	40
Curculionidae	*Ceutorhynchus obstrictus* (Marsham)	–	–	–	–	5	–	–	–	–	–	5
	Ceutorhynchus pallidactylus (Marsham)	–	–	–	–	–	–	–	4	–	–	4
	Sitona hispidulus (Fabr.)	–	–	–	–	–	–	–	–	1	1	2
	Sitona lineatus (L.)	–	3	2	3	–	1	–	1	–	7	17
Chrysomelidae	*Aphthona euphorbiae* (Schrank)	–	–	–	–	–	4	1	4	1	–	10
	Longitarsus luridus (Scopoli)	1	1	–	–	–	–	1	–	–	–	3
	Oulema melanopus (L.)	–	–	–	–	–	–	–	–	–	1	1
	Phaedon tumidulus (Germar)	–	–	–	–	–	–	–	–	–	1	1
	Phyllotreta undulata Kutschera	–	–	–	–	–	–	–	1	–	1	2
	Phyllotreta nigripes (Fabr.)	–	–	–	–	–	–	–	–	–	1	1
Coccinellidae	*Halyzia sedecimguttata* (L.)	–	–	–	–	–	–	1	–	–	–	1
	Tytthaspis sedecimpunctata (L.)	–	1	–	–	–	–	–	–	–	5	6
Helophoridae	*Helophorus brevipalpis* Bedel	–	–	–	–	–	–	–	–	1	–	1
Heteroceridae	*Heterocerus* sp.	–	–	–	–	–	–	–	–	–	1	1
Histeridae	*Kissister minimus* (Aubé)	–	1	–	–	–	–	–	–	–	–	1
Hydrophilidae	*Cercyon littoralis* (Gyllenhal)	–	–	–	–	–	20	23	3	4	17	67
Latridiidae	*Cartodere nodifer* (Westwood)	–	–	–	–	–	–	–	1	–	–	1
	Cortinicara gibbosa (Herbst)	–	–	–	–	–	–	–	–	–	1	1
	Corticaria crenulata (Gyllenhal)	–	–	–	–	–	–	–	–	–	1	1
Nitidulidae	*Meligethes aeneus* (Fabr.)	–	–	–	–	12	–	1	3	6	10	32
Scarabaeidae	*Aphodius prodromus* (Brahm)	–	–	–	–	–	–	–	–	1	–	1
Staphylinidae	*Aleochara bipustulata* (L.)	–	–	–	–	–	–	2	–	–	9	11
	Aleochara grisea Kraatz	–	–	–	–	–	–	–	–	–	1	1
	Aleochara obscurella Gravenhorst	–	–	–	–	–	4	–	–	–	–	4
	Aleochara punctatella Motschulsky	–	–	–	–	–	–	–	–	–	2	2
	Aleochara verna Say	–	–	–	–	–	–	1	–	–	–	1
	Aloconota gregaria (Erichson)	–	5	–	–	–	–	–	–	–	4	9
	Anotylus sculpturatus (Gravenhorst)	–	3	–	–	–	–	–	–	–	–	3
	Atheta triangulum (Kraatz)	–	3	–	–	–	–	–	–	–	–	3
	Cafius xantholoma (Gravenhorst)	3	1	–	2	–	5	15	1	5	11	43
	Chilomorpha longitarsis (Thomson)	–	1	–	–	–	–	–	–	–	–	1
	Cypha longicornis (Paykull)	–	–	–	–	–	–	–	–	–	1	1
	Dimetrota atramentaria (Gyllenhal)	–	1	–	–	–	–	–	–	–	2	3
	Mocyta clientula (Erichson)	–	–	–	–	–	2	–	–	–	2	4
	Mocyta fungi (Gravenhorst)	–	–	–	–	–	–	1	–	–	–	1
	Myrmecopora oweni Assing	1	–	–	–	–	–	–	–	–	–	1
	Omalium laeviusculum Gyllenhal	–	–	–	–	–	2	2	4	9	4	21
	Omalium riparium Thomson	–	–	–	–	–	–	–	–	1	8	9
	Omalium rivulare (Paykull)	–	1	2	–	–	1	–	–	–	–	4
	Phytosus spinifer Curtis	–	–	–	–	–	42	2	–	–	–	44
	Tachyporus hypnorum (Fabr.)	–	–	–	–	1	–	4	–	–	5	10
	Teropalpus unicolor (Sharp)	–	–	–	–	–	–	–	–	–	3	3
	Thinobaena vestita (Gravenhorst)	–	–	–	–	–	–	1	–	4	–	5
	Xantholinus linearis (Olivier)	–	–	–	–	–	–	1	–	–	1	2
	Xantholinus longiventris Heer	–	1	–	–	–	–	–	–	–	–	1
	Total no. of individuals	5	56	4	5	18	83	61	23	39	108	402
	Total no. of species	3	14	2	2	3	11	16	10	13	31	54

live in decaying animal or plant material and several species are adapted to living on the coast under decomposing seaweed. All of the species recorded here are ectoparasitoids of dipteran pupae and attack a range of kelp flies found in the wrack (especially species of *Coelopa* and *Orygma;* Scott, 1920*)*.

Chrysomelidae and Curculionidae are generally considered to be foliage feeders, yet members of these families were found at all ten sites and 46 specimens belonging to ten species were recorded. A single specimen of the weevil *Sitona lineatus* (L.) was found by Hodge & Jessop (1996) in strandlines at Whitburn on the north east coast of England, and it was supposed the individual had strayed from vegetation on nearby cliffs. However, Backlund (1945) also recorded *S. lineatus* in Scandinavian wrack beds and, in the current study, 20 specimens of this species were recorded in strandlines at nine sites, suggesting that it might regularly utilize this habitat (Table 1; Appendix 1).

Most of the species collected are considered fairly widespread in the UK, although many are localized to coastal habitats. The Nationally Scarce carabid *Licinus depressus* (Paykull) was found on the shingle beach at Shellness on the Isle of Sheppey (Appendix 1: Lindroth, 1974). This species is often associated with chalk or gravel and has previously been recorded from other coastal sites in Kent, primarily on the south coast (Luff, 1998). The staphylinid parasitoid, *Aleochara verna* Say, a species regarded as Nationally Scarce, was found in dry strandlines on the upper shore at Sheerness (Appendix 1) and also at Margate (Table 1). One of the few individuals to be collected from the sporadic strandlines at Dungeness was another staphylinid, *Myrmecopora oweni* Assing [*sensu* Owen (1999), but see Hammond (2000) who raises some uncertainty regarding the taxonomy and nomenclature for *M. oweni* and the closely related *M. brevipes*]. Owen (1999) suggested that *M. oweni* is widespread along the southern coast of Britain but we believe this species has not previously been recorded as far east as Dungeness and this specimen represents the first record of *M. oweni* in Kent (E. Philp, pers. comm.).

Seasonal patterns in beetle abundance

A peak in the number of individuals collected occurred between June and August (Fig. 2). The samples taken in May were very poor in terms of numbers of specimens collected. This was because most beaches did not have any major strandlines when the samples for this month were collected and, due to some hot dry weather, any

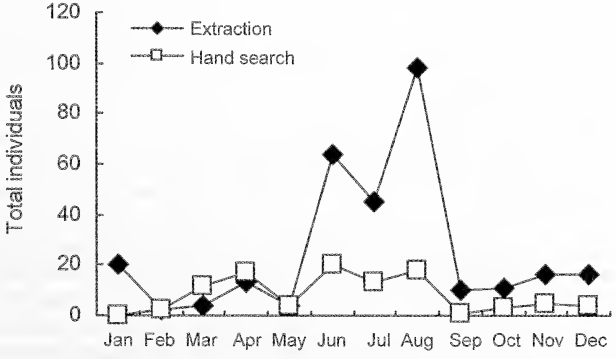

Fig. 2. The total number of Coleoptera collected from strandlines at ten sites in Kent by hand searches and extraction sampling over a 12-month period.

strandline material present was extremely sparse and desiccated. The seasonal patterns in abundance were largely a consequence of the patterns observed for the three most common species. *Cercyon littoralis* and *Cafius xantholoma* were most abundant from June to August and *Phytosus spinifer* Curtis had a clear peak in abundance in the August samples. The drop in numbers in May was common to all three of these species. To augment the summer peaks, 29 specimens of *Meligethes aeneus* (Fabr.) were collected in the July samples and 39 specimens of *Trechus quadristriatus* (Schrank) were found in August.

A number of species were still active in the wrack beds during winter. For example, *Cercyon littoralis*, *Aloconota gregaria* (Erichson), *Atheta triangulum*, *Omalium laeviusculum*, *Omalium rivulare* (Paykull) and *Thinobaena vestita* were all collected in January and/or December.

The influence of shore type on beetle abundance

The catches of beetles were small on the shingle beaches, with an average total catch over 12 months (in the combined hand searching and extraction samples) of only 11 individuals per site (Fig. 3). In comparison, the sites with sandy shores and those containing both sandy and shingle components had average total catches of around 70 individuals (Fig. 3). One factor that might explain some of these differences pertains to the ease of catching beetles. Collecting beetles by hand on the flat and uniformly-coloured surface formed by damp sand was relatively simple compared to catching beetles on uneven shingle, where they often rapidly disappeared down the crevices between the pebbles. However, the difference in numbers between shingle and sandy beaches was also seen in the extraction samples and another, more ecological explanation, concerns the condition of the strandlines occurring on the different classes of substrate. On sandy beaches the compacted damp sand on the underside of the wrack beds appeared to prevent the seaweed desiccating too rapidly and maintained it in a sufficiently moist state for insects to utilize. Conversely the strandlines on shingle beaches, unless substantial amounts of material were present, were prone to rapid desiccation and the material became dry, brittle and generally inhospitable for insects.

Comparison of collecting techniques

At nine of the ten sites the extraction samples produced more individual beetle specimens than the hand searches (Fig. 3). As a consequence of this, most species were obtained in greater numbers by the extraction process than the hand searches, although there were some notable exceptions: seven of the nine specimens of *Aloconota gregaria* (Erichson) were obtained by hand searching, as were all ten specimens of *Tachyporus hypnorum* (Fabr.).

A maximum of 38 specimens was collected in a single (2 L) extraction sample, and 11 specimens in a single ten-minute hand search. However, in 120 site visits, the extraction method obtained a total of only 303 individuals (47 species), the hand searches only 99 (26 species). These low total catches are an unfortunate consequence of the systematic nature of the sampling regime used, in that the majority of samples returned no specimens. This prevalence of zeroes (75% of hand searches and 60% of extraction samples) resulted primarily from there being no tangible strandline material present in nearly half of the 120 sampling visits. For some months (e.g. May, see above) and sites (e.g. Dungeness, Sandgate & Folkestone) there was almost a complete absence of strandline or drift line material at the time of the sampling visits. This highlights a rather obvious point, also made by Duffey (1968), that (in

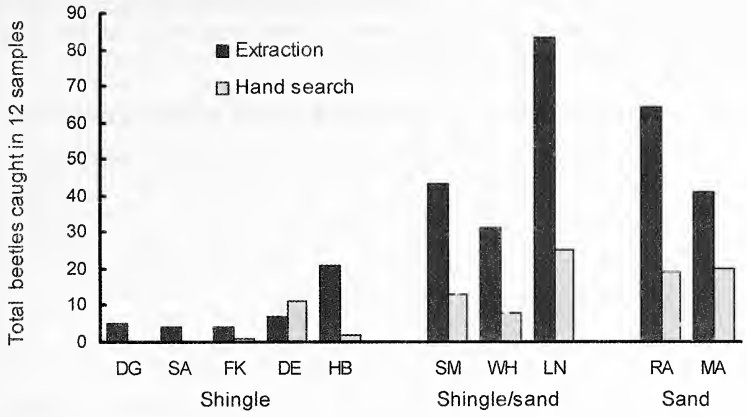

Fig. 3. The total numbers of beetles collected in twelve hand searches and twelve extraction samples taken from the ten primary survey sites. [DG – Dungeness; SM – St Mary's Bay; SA – Sandgate; FK – Fokestone; DE – Deal; RA – Ramsgate; MA – Margate; HB – Herne Bay; WH – Whitstable; LN – Leysdown]

common with other ephemeral insect resources) a site can only possess an easily-defined strandline fauna when this resource is actually present. Even when strandlines did occur, they represented a highly variable resource: if the wrack was too old and desiccated or, conversely, too fresh and recently deposited by the tide, then it was unlikely to contain Coleoptera.

Hand searching might miss some of the smaller species, as dislodging specimens from the wrack can be difficult and small specimens can be difficult to spot against the dark background of decomposing seaweed. Also, the problem of losing specimens among the shingle during hand searching might explain some of the differences observed, although the disparity between techniques also occurred on sandy beaches. An obvious solution to the low numbers found in the hand searches is to extend the duration of the search. However, recent trials have found that even when a sample of wrack has undergone thorough hand searching in the field, beetle specimens can still be extracted from the same material in the laboratory (Hodge, unpub.). Extraction sampling has been used in previous systematic studies of wrack bed insects (Hodge & Jessop, 1996; Hodge & Arthur, 1997) but, in a study of coastal spiders, Duffey (2004) advocated the use of hand searching as it allowed the collector to accurately record the location and niche where each specimen was found. With extraction sampling also, there is a need to look more closely at where the sample of material is obtained from within the wrack bed. This would enable more precise information on where individual beetles are found within the heap and whether they actually occur amongst the wrack material or in the sediment beneath it (Hodge & Jessop, 1996; Hammond, 2000).

Interestingly, in support of Duffey's (2004) findings, although extraction sampling was by far the more successful technique in terms of numbers of beetle specimens obtained, the converse situation occurred for spiders, where twice as many individuals were obtained by hand searching than the extraction technique (Hodge & Vink, 2006). This indicates that any attempt to describe the whole arthropod fauna of wrack beds is likely to require the use of a number of complementary collecting techniques, each more or less appropriate to certain taxa. The setting of pitfall traps

in the substrate beneath wrack beds has been utilized with some success (Hodge *et al.*, 1996) and the separation of invertebrates from wrack material by Tullgren funnels has been used to collect smaller species.

Geographical patterns in species distribution and beetle assemblages

Detailed examination of distribution patterns was problematic because the majority of species (76%) were recorded in low numbers ($\leqslant 5$). Of the common species, *Cafius xantholoma* was the most widespread, being recorded at eight of the main sites and was one of only three species found on the sparse strandlines that occurred at Dungeness (Table 1). From the results of the main survey, *Cercyon littoralis* and *Omalium laeviusculum* appeared restricted to strandlines at the five northern-most sites (Ramsgate to Leysdown; Table 1). However, *C. littoralis* was recorded at Dymchurch and Folkestone Warren during the more informal sampling (Appendix 1), indicating that this species is actually more widespread around the county. *Trechus quadristriatus* was widespread but not recorded on any of the purely shingle beaches (Table 1). This preference for sandy beaches was given further support by further specimens being found at Dymchurch and Sheerness in the *ad hoc* samples (Appendix 1).

Of the other common species, 42 of 44 specimens of *Phytosus spinifer* were recorded on the sandy beach at Ramsgate, the remaining pair being found at nearby Margate. However, a single specimen was also recorded on the shingle beach at Lydd on the south coast (see Appendix 1) suggesting this species might also be more widespread than the main survey suggests. The pollen beetle *Meligethes aeneus* (Fabr.) was fairly abundant (32 specimens) and widespread (five sites) although was not found at the south coast sites. Other nitidulids utilize decaying organic resources such as leaf litter, rotting fruit and dung and it seems *M. aeneus* does not find strandlines too inhospitable.

In terms of species found at each site, no two of the assemblages could be considered particularly 'similar', as many species were collected as singletons and only a small proportion (44%) occurred at more than one location (12 species occurred at three or more sites). A cursory examination of the assemblages in Table 1 suggests there might be a split separating the mainly species-poor southern sites (Dungeness to Deal) from those further north. Even though St Mary's Bay had high numbers of specimens and species it still differed from the northern sites because of its high numbers of *Trechus quadristriatus* and absence of the common species *Cercyon littoralis*, *Meligethes aeneus*, *Omalium laeviusculum* (and only a single specimen of *Cafius xantholoma*). The species-poor southern sites (Table 1) all had shingle shores with very sparse and infrequent deposits of wrack material. There is a need to investigate sandy beaches on the south coast, preferably with regular deposits of material (such as those at Greatstone and Folkestone Warren) to try and further separate geographical effects from those of shore type.

Conclusions

This survey represents an initial examination of the beetle assemblages occurring in marine strandlines around the Kent coast. The findings imply there might be differences in the assemblages found on the north and south Kent coasts, and that the assemblages that occur on shingle shores are relatively sparse compared to those on sandy beaches. Not surprisingly, the sites that had high beetle abundance and diversity were those that had a consistent presence of suitable strandlines over the course of the year, such as Leysdown, Ramsgate, Margate and St Mary's Bay.

In total 60 species were recorded, although nearly half were observed as singletons and further sampling is required to establish whether these records represent adventitious individuals or species that occur rarely but consistently in the strandline environment. Taxon accretion curves (Chao estimators; Species Diversity & Richness Software, Pisces Conservation Ltd) based on the total monthly collections suggest strandlines at the ten main sites might possess a total beetle fauna of between 90 - 110 species. In combination with surveying new sites, further species are likely to be found, and more detailed information on species natural histories would be obtained, by considering the different stages of wrack decomposition (Strenzke, 1963; Lavoie, 1985), the horizontal and vertical location within the wrack bed (including the sediment beneath it) (Philips & Arthur, 1994; Hodge & Jessop, 1996; Hammond, 2000) and the species of algae from which the wrack bed is composed.

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Appendix 1

Records of beetles collected from sites not used in the main study, or from main sites visited on other occasions than that of the main survey. All samples were taken in or under strandline material. [Authorities given only for those species not found in the main survey].

Lydd (TR085208): 25.ix.2004 *Phytosus spinifer*, 1; 3.i.2004 *Cortinicara gibbosa*, 1. Dymchurch (TR100288): 28.viii.2004 *Trechus quadristriatus*, 2; *Cercyon littoralis*, 2; *Cafius xantholoma*, 1. Folkestone Warren (TR243369): 28.iv.2004 *C. littoralis*, 3; *C. xantholoma*, 1; *Teropalpus unicolor*, 2. Broadstairs (TR399680): 30.x.2004 *C. littoralis*, 1; *Monotoma picipes* Herbst, 1; *C. xantholoma*, 1; *Chilomorpha longitarsis*, 1. Margate (TR349708): 3.ix.2004 *C. littoralis*, 3. Whitstable (TR106669): 3.ix.2004 *T. quadristriatus*, 2; *Sitona hispidulus*, 2. Hampton (TR158683): 31.x.2004 *C. littoralis*, 1. Shellness (TR054678): 9.viii.2004 *Bembidion varium* (Olivier), 1; *Licinus depressus* (Paykull), 1 **nb**; *Sitona lineatus*, 1; *C. littoralis*, 6; *Aleochara bipustulata*, 2; *C. xantholoma*, 5; *Megalinus glabratus* (Gravenhorst), 1. Leysdown (TR041701): 9.viii.2004 *C. littoralis*, 1; *Megasternum concinnum* (Marsham), 1; *Acrotona muscorum* (Brisout), 1. Warden (TR024718): 9.viii.2004 *S. lineatus*, 1; *Aphthona euphorbiae*, 1; *C. littoralis*, 7. Minster (TQ956739): 9.viii.2004 *A. bipustulata*, 2. Sheerness (TQ920751): 9.viii.2004 *T. quadristriatus*, 2; *S. lineatus*, 1; *A. bipustulata*, 5; *Aleochara verna*, 2 **nb**; *C. xantholoma*, 1; *Mocyta (Atheta) fungi*,1; *Tachyporus hypnorum*, 1.

nb - Notable

BEECH RED SPIDER MITE *EOTETRANYCHUS FAGI* (ZACHER) (ACARI: TETRANYCHIDAE), A PEST OF *FAGUS SYLVATICA* NEW TO BRITAIN

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Abstract

The tetranychid mite *Eotetranychus fagi* (Zacher), a pest of common beech, *Fagus sylvatica* L. is reported in Britain for the first time from Surrey (VC 17), and was later found in Middlesex (VC 21), Hertfordshire (VC 20) and Cambridgeshire (VC 29).

Introduction

Eotetranychus fagi (Zacher) was discovered in Britain for the first time, on 1.ix.2004, on a common beech hedge (*Fagus sylvatica* L.) in a private garden near Guildford, Surrey (VC17) TQ 023505. The owner had noticed discoloured foliage and forwarded a sample to the entomology section at the Royal Horticultural Society's (RHS) Garden in Wisley, from where it was sent to the Central Science Laboratory (CSL) for the mites to be identified. Soon after the first find of *E. fagi* near Guildford, additional finds were confirmed from two other locations: Norwood, Middlesex (VC 21) TQ 098922, 6.ix.2004, and Burpham, Surrey TQ 009517, 13.ix.2004, in both cases from beech hedges. In 2006 *E. fagi* was found in West Byfleet, Surrey (no grid reference recorded) 28.viii.2006, Royston, Hertfordshire (VC 20) TL 358406, 20.ix.2006, and in Cambridgeshire (VC 29) TL 451569, 14.x.2006, again from beech hedges.

Materials

Five slides with six female and five male specimens were prepared and deposited in the collection of the Natural History Museum, London (NHM) (Accession Number BMNH (E) 2006-110); two slides with four females, two males and two protonymphs were deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin (Accession Numbers ZMB 47254 & 47255) and nine slides with eight females, 19 males, six protonymphs and eight deutonymphs (Ref Nos. CSL 20413358 & 20614605), as well as dead mite colonies on dried leaf material were retained within the CSL collection.

Distribution and hosts

Eotetranychus fagi was described from specimens collected in Germany from common beech (Zacher, 1922) and has since been recorded in Austria (Zacher, 1932) Georgia (former Soviet Republic) (Reck, 1950), Italy (Bernini, Castagnoli & Nannelli, 1995), Poland (Dobosz & Skorupska, 1995), Switzerland (Gunthart & Gunthart, 1959), Belgium (Witters *et al.*, 2004) and England from September 2004. This mite has also been recorded on *Fagus orientalis* Lipsky (Reck, 1950).

Spider mites, similar in appearance to the specimens found near Guildford, were recorded by the RHS on beech hedges at five other locations during 2004 and 2005,

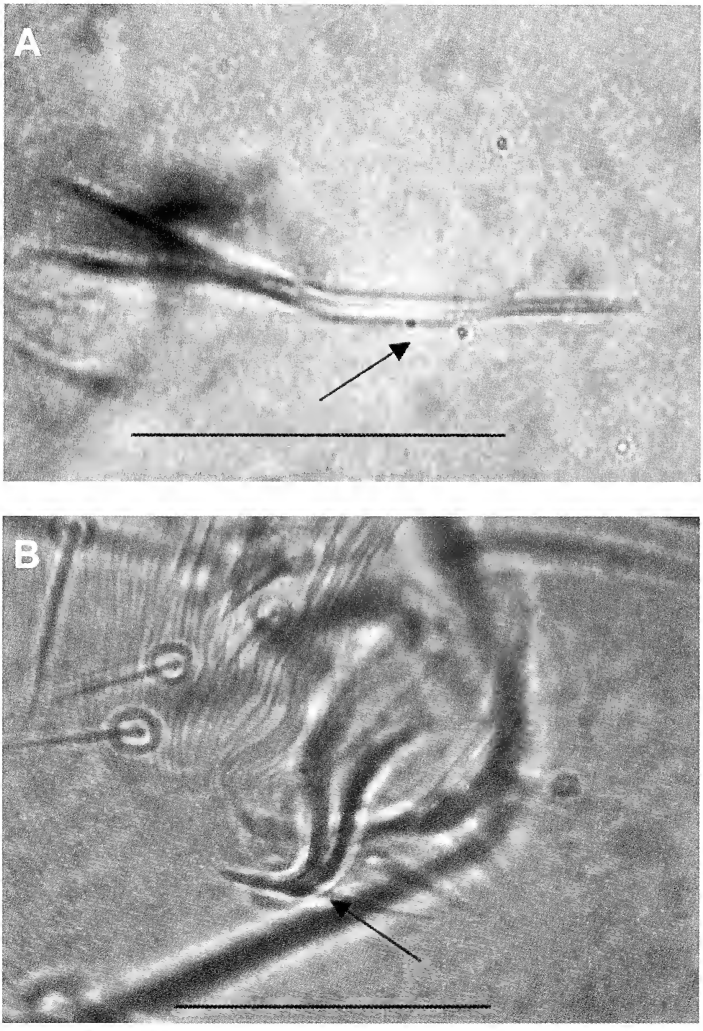

Plate 1. Aedeagus of (A) *Eotetranychus carpini* and (B) *Eotetranychus fagi* indicated by arrows. Scale bars = 25μm.

two in Middlesex and three in Surrey, but samples were not collected and so the identity of the mites was not verified from slide-mounted specimens.

Identification and damage

In comparison to other tetranychid mites, *E. fagi* are small; females measure between 0.36–0.39 mm in body length whilst males are slightly smaller at 0.30 mm and have a more pointed posterior body margin. In life the adult mites are pale

greenish-yellow with a pair of pink anterior 'eye spots', some small reddish-pink spots on the dorsal surface of the opisthosoma, and the gut contents can sometimes be seen as a dark area inside the body. The eggs resemble those of the common two-spotted spider mite, *Tetranychus urticae* (Koch), being spherical, pale yellowish-green and lacking a dorsal stalk or 'stipe', a structure present on the eggs of the common polyphagous species *Panonychus ulmi* (Koch).

Identification of the adults to genus is quite straightforward using the key provided by Bolland *et al.* (1998), but specific identification is less easy as there is no comprehensive key to the known species of *Eotetranychus*. There were no reference specimens of *E. fagi* in the NHM collection (Dr. A.S. Baker, *pers comm.*) and Zachers' material could not be located. Slide mounted specimens were compared to the descriptions of all seven *Eotetranychus* species known to occur in Britain, and to those of the four *Eotetranychus* species recorded on *Fagus* spp. Of the latter, namely *E. carpini* (Oudemans), *E. fagi, E. hicoriae* (McGregor) and *E. pallidus* (Garman), only *E. carpini* had previously been found in Britain. *Eotetranychus carpini* can most easily be separated from *E. fagi* by the shape of its aedeagus, which is long, slender and sinuous in *E. carpini* as opposed to being shorter with a sharply ventrally directed posterior that tapers to a point (Plate 1A & B).

Only one other species of spider mite, *P. ulmi*, has been recorded on *F. sylvatica* in the British Isles. Adults of *P. ulmi* are easily separable from *Eotetranychus* in the field being larger, entirely reddish, globular and with dorsal body setae arising from prominent tubercles.

The presence of *E. fagi* colonies on beech is indicated by a sparse silk webbing on the under surfaces of the leaves, particularly at the base of the leaf blade. The undersides of infested leaves have black excrement spots and are littered with cast mite skins and egg shells. The feeding damage consists of a fine pale mottling of the upper leaf surface concentrated along the veins and in the axils of the lateral veins. Mottling of beech leaves can also be caused by leafhoppers but this tends to be of a coarser nature and more randomly distributed over the upper leaf surface. Leaf damage caused by *E. fagi* is unsightly but is unlikely to affect the growth of beech hedges; however, Witters *et al.* (2004) reported that feeding by *E. fagi* causes leaves to turn brown and fall prematurely.

Discussion

Both the confirmed and unconfirmed records of *E. fagi* were from garden hedges rather than tree forms of beech. It is possible that a hedge provides a warmer microclimate than a tree and may allow the development of a larger mite population. In addition the foliage of a hedge is easier to observe and thus any symptoms of attack are likely to be more noticeable. All the records of *E. fagi* were made in the autumn, which suggests that damage does not become apparent until late in the growing season.

Whether *E. fagi* is an endemic species that has until now remained undetected or is a recent introduction is not known. Beech hedging is widely grown and, given the availability of suitable hosts *E. fagi* has the potential to be more widely distributed; however, the second author has also looked for *E. fagi* in south-east Yorkshire (VC 61), north-east Yorkshire (VC62), Carmarthenshire (VC44) and Pembrokeshire (VC45) without success. The current records therefore indicate that this species is restricted at present to the south-east of England.

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SHORT COMMUNICATION

***Lasius brunneus* (Latreille) (Hymenoptera: Formicidae) in Somerset.** – *Lasius brunneus* is now known from a number of counties in southern England and Wales. This Nationally Scarce species is common in the Severn Vale and has been found twice in Wiltshire (Alexander & Taylor, 1997; Blacker & Collingwood, 2002; *pers. obs.*). However, it has not previously been reported from nearby Somerset, despite searches (Collingwood, *pers. comm.*).

Ants were found on *Fraxinus excelsior* L. and *Tilia cordata* Mill. in Weston Big Wood, Portishead (ST455751; VC6 North Somerset), 10 June 2006. These were immediately recognised as *L. brunneus*, though a few were collected and later confirmed as such. It is likely that this species occurs elsewhere in Somerset but has so far been overlooked. – Mike J. Lush, Just Ecology, Woodend House, Woodend, Wotton-Under-Edge, Gloucestershire, GL12 8AA, U.K.

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CURRENT KNOWLEDGE OF BRITISH ACULEATE HYMENOPTERA WITH SPECIAL REFERENCE TO THE OCCURRENCE OF HIGH QUALITY SPECIES ON PRIORITY HABITATS

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ABSTRACT

An account is given of British aculeate species and their habits based on current and historical information. Excluding the Dryinidae, Embolemidae, Bethylidae species, there are 573 species currently on the British list of which 29 species are only found in the Channel Islands and 40 species are probably now extinct in England, Wales and Scotland. The British species are divided into High Quality species with Very Rare, Rare or Scarce statuses and Low Quality Species with Restricted, Widespread or Universal statuses. Current Priority Species are also considered. The Priority Habitats of the High Quality species are tabled and it is found that five habitats (Lowland Heathland, Maritime Cliffs and Slopes, Lowland Calcareous Grassland, Coastal Sand Dunes and Lowland Dry Acid Grassland) are particularly important. The non-Priority Habitat, Post-industrial Sites, is of equal importance. Dividing the solitary species into parasitic and non-parasitic species it is found that the parasitic High Priority Species are the most threatened group of species. Concerning nest-site characteristics, the solitary wasp species are particularly associated with aerial sites and the solitary bee species with subterranean sites. Adults of the solitary wasp species are mainly summer species while adults of the solitary bees vary from being early spring to autumn species. The food requirements of the aculeates are considered as well as monitoring methods for single species and species assemblages. Finally, examples of good and bad management of aculeate species are reviewed.

INTRODUCTION

In this paper an attempt is made to summarise current information of British aculeate Hymenoptera (excluding Ireland and the Channel Islands) in an historical context. Excluding vagrant and extinct species, the distribution and abundance of each species will be used to assign each species a status so that the rare and scarce or High Quality species can be recognised. The High Quality species will then be associated with Priority and non-Priority habitats in order to find those specialist species which are restricted to one Priority Habitat.

Quick reviews are given of parasitic and non-parasitic species, nest-site characteristics, adult activity patterns and food resources. Finally, monitoring methods and good and bad management practices will be considered.

Reference should be made to Else (2004) for authority of species and their synonyms.

HISTORICAL AND CURRENT SOURCES OF INFORMATION

There is a strong tradition in publishing national and county reports of the aculeate Hymenoptera from the nineteenth century onwards. Nationally, early accounts of bees are given by Kirby (1802) and Shuckard (1866) and of wasps by

Shuckard (1837). Smith (1855, 1858) gives an account of the wasps, ants and bees often including species information on abundance, nest-site characteristics and habitats in which found. Saunders (1896) extends the work of Smith with species information on distribution, abundance, adult activity, habitat, nest-site characteristics, flowers visited, prey collected and some attempt to associate cleptoparasites with their hosts. None of these accounts considered the Chrysididae. In the check list of Yarrow (1943) all aculeates, including the Chrysididae, are considered with brief information on adult flight period, nest-site characteristics, food sources and host-parasite associations.

County reports started with Bold (1870) on Northumberland and Durham, Bridgman (1879) on Norfolk and Morley (1899) on Suffolk. Early accounts of part of a county are given by Dale & Dale (in Spooner, 1942) of Glanvilles Wotton in Dorset, Harwood (1884) of Colchester in Essex and Perkins (1892) of Wootton-under-Edge in Gloucestershire. Perkins' account is particularly readable because of the introductory notes on each of the taxonomic groups of aculeates. From the start of the twentieth century the aculeates, often including the Chrysididae, were considered in the Victoria County History Reports, e.g. Kerrich (1938) on Cambridgeshire and Richards (1939) on Oxfordshire and other county reports, e.g. Perkins (1923) on Devon and Chambers (1949) on Bedfordshire. The accounts of Kerrick and Richards give much species information: sites where recorded with dates, names of recorders, habitats used, nest-site characteristics, prey collected, hosts of cleptoparasites and flowers visited. The account of Chambers compares the species assemblages of different regions of Bedfordshire based on surface geology anticipating the later development of Natural Areas. During the 1990s and 2000s, county reports started to include species distribution maps, e.g. Baldock & Collins (1999) on Surrey, Harvey (1999) on Essex, Allen (2001) on Kent and Archer (2002) on Yorkshire. The accounts of Harvey and Archer also consider the conservation needs of species.

In recent times the conservation of aculeates has been a driver in the assembling of species information. Shirt (1987) with the help of G.R. Else and G.M. Spooner considered that 37 species were Endangered (Red Data Book 1 species, in danger of extinction), 12 species were Vulnerable (Red Data Book 2 species, likely to become endangered in the near future) and 97 species were Rare (Red Data Book 3 species, at risk as found in, at most, 15 10-km squares). At least eight of the Endangered species were believed to be extinct and a further 18 species were extinct before 1900. Species data given were: habitats, food sources, adult activity, probability of extinction, threats and nest-site characteristics.

Falk (1991) reviewed the RDB species plus a new category of Nationally Notable (now called Scarce) Species. These Nationally Scarce species were divided into a List A of species found in 16–30 10-km squares from 1970 onwards and List B of species found in 31–100 10-km squares from 1970 onwards. A great deal of species information was provided, supported by extensive literature references. Species information given was: distribution; habitat; ecology including nest-site characteristics, food resources, adult activity and host-cleptoparasite relationships; status (including proposed status changes of Red Data Book species); threats and management.

From 1997, the Bees, Wasps and Ants Recording Society (BWARS) has issued provisional atlases of the British and Irish aculeates including the Channel Islands. To date five parts have been published (1997, 1998, 2001, 2002, 2005) dealing with 282 species plus one species of the Embolemidae and two species of the Bethylidae and with 302 species yet to be considered. The atlases include a map for each species

together with a profile of the information available, including its overseas distribution.

The UK Biodiversity Steering Group (1995) stated the need to take conservation measures for key habitats and species. Some of these species and habitats were later called Priority Habitats and Species and became the basis of the UK Biodiversity Action Plan. Priority Species are British species which are globally threatened or which are rapidly declining in the UK (www.ukbap.uk/species.aspx). Priority Habitats are British habitats, for which the UK has international obligations, or are at risk due to their recent decline or rarity, or are important for BAP species (www.ukbap.uk/habitats.aspx).

Finally, Archer (2005) wrote a report available on a CD from Buglife (The Invertebrate Conservation Trust) where the rare and scarce species, including the Priority Species (but excluding the Dryinidae, Embolemidae and Bethylidae species) are grouped by Priority Habitats. This report is concerned with managing Priority Habitats for aculeates and extensive use is made of Falk (1991) and the Provisional Atlases of BWARS. The following species information is considered: habitat management techniques, if a Priority Habitat specialist, subhabitat preferences, feeding preferences, monitoring techniques based on current information and examples of good and bad management.

British and Irish list of species

Excluding the Dryinidae, Embolemidae and Bethylidae, there are 573 aculeate species currently on the British and Irish list (Else, 2004). The distribution of these species is given in Table 1. Twenty-nine species are only found in the Channel Islands while 40 species are now probably extinct in England, Wales and Scotland (Table 2). Probably 16 of these extinct species were only vagrants. Of course, it is difficult in some cases to decide whether a species is extinct or waiting to be re-discovered. Recently *Halictus eurygnathus* Blüthgen was re-discovered on Sussex downland after 45 years (Falk, 2004). Nine of these extinct species can still be found on the Channel Islands. With the removal of the extinct and Channel Islands only species, 504 (423 solitary, 81 social) species are found in England, Wales and Scotland (i.e. Britain) including Ireland. No further reference will be made to species found in Ireland due to the lack of data.

There is a similar number of solitary wasp and bee species while the social species represent 16% of all species.

Species statuses

Although all species are of conservation value it must be recognised that some species are more in need of help than other species, the so-called 'species of conservation concern'. As already indicated, such species have been given statuses such as RDB and Nationally Scarce Species, Priority Species and the new IUCN statuses (IUCN, 1994) which have not yet been applied to the aculeates.

In order to react quickly to changes in species statuses as a result of new information, Archer (1999, 2002) divided the British aculeate species into six status categories. The 'species of conservation concern' were called 'High Quality species' and each species was given a 'Very Rare', 'Rare' or 'Scarce' status. The remaining species were called 'Low Quality species' and each species given a 'Restricted', 'Widespread' or 'Universal' status. These statuses are published and kept up-to-date in the Newsletters of the BWARS. The statuses of the High Quality Species are based

Table 1. The distribution of the aculeate Hymenoptera of the British Isles

Taxonomic Group	Channel Islands only	Extinct on Mainland (Britain)	Channel Islands Still with extinct (British) species	Mainland (British)	Total Species
Solitary Wasps					
Chrysididae	2	1	1	30	33
Tiphiidae	0	0	0	3	3
Mutillidae	0	0	0	3	3
Sapygidae	0	0	0	2	2
Scoliidae	1	0	0	0	1
Pompilidae	3	2	1	39	44
Eumeninae	1	3	1	20	24
Sphecidae	3	0	0	4	7
Crabronidae	3	8	2	112	123
Total Solitary Wasps	13	14	5	213	240
Solitary Bees					
Colletinae	0	1	0	20	21
Andreninae	1	7	0	62	70
Halictinae	4	6	1	50	60
Melittinae	0	0	0	6	6
Megachilinae	2	5	2	33	40
Anthophorinae	4	1	0	38	43
Xylocopinae	0	1	0	1	2
Total Solitary Bees	11	21	3	210	242
Social Species					
Formicidae	5	1	1	48	54
Vespinae	0	1	0	9	10
Apinae	0	3	0	24	27
Total Social Species	5	5	1	81	91
Total Species	29	40	9	504	573

on the occurrence of a species in the number of 10-km squares from 1970 onwards in England, Wales and Scotland but not Ireland and The Channel Islands. Very Rare species (equivalent to RDB species) are found in 1–15 10-km squares, Rare species (equivalent to Nationally Scarce Species list A) in 16–30 10-km squares and Scarce species (equivalent to Nationally Scarce Species list B) in 31–70 10-km squares. The divider of 70-km squares was used instead of the 100-km squares of Falk (1991) because as the numerical data became available the divider at 70-km squares better reflected Falk's concept of National Scarce List B which was really derived from qualitative data. The Priority species usually have a Very Rare status. The statuses of the Low Quality Species are based on their distribution in England, Wales and Scotland when found in more than 70 10-km squares from 1970 onwards. Restricted species are found in the Institute of Terrestrial Ecology (I.T.E.) Land Classification groups 1 and 2 (Pienkowski *et al.*, 1996) (Southern England, South-West and Southern Coasts of England) which is roughly about half of England. Widespread species extend into I.T.E Land Classification groups 3 and 4 (Midlands Lowlands and Central Coasts) which is roughly about three-quarters of England, lowland Wales and south-west Scotland with Northumbria excluded. Strictly these definitions

Table 2. Extinct and vagrant (V) species of England, Wales and Scotland.

Hedychrum rutilans Dahlbom
Formica pratensis Retzius
Priocnemis propinqua (Lepeletier) (V?)
Arachnospila rufa (Haupt)
Eumenes papillarius (Christ) (V)
Odynerus reniformis (Gmelin *in* L.)
Ancistrocerus quadratus (Panzer)
Polistes dominulus (Christ) (V?)
Dinetus pictus (Fab.) (V?)
Tachysphex obscuripennis (Schenck)
Crossocerus congener (Dahlbom) (V?)*
Lestica clypeata (Schreber) (V?)
Lindenius pygmaeus (Rossi) (V?)
Psen ater (Olivier)
Mellinus crabroneus (Thunberg)
Cerceris sabulosa (Panzer)
Hylaeus punctulatissimus Smith
Andrena floricola Eversmann (V)
Andrena lepida Schenck
Andrena nana (Kirby)
Andrena nanula Nylander (V?)
Andrena polita Smith
Andrena tridentata (Kirby)
Andrena vaga Panzer (V?)
Halictus maculatus Smith
Halictus subauratus (Rossi) (V?)
Lasioglossum laeve (Kirby)
Rophites quinquespinosus Spinola (V?)
Dufourea halictula (Nylander)
Dufourea minuta Lepeletier
Osmia niveata (Fab.) (V)
Hoplitis leucomelana (Kirby) (V?)
Chalicodoma ericetorum (Lepeletier)
Megachile lapponica Thomson (V?)
Coelioxys afra Lepeletier
Melecta luctuosa (Scopoli)
Xylocopa violacea (L.) (V)
Bombus cullumanus (Kirby)
Bombus pomorum (Panzer) (V)
Bombus subterraneus (L.)

*See Acknowledgments and Caution Statement

of Restricted and Widespread species are for southern Restricted and Widespread species. In practice, northern Restricted and Widespread species can occur. Universal species are found throughout England, Wales and Scotland, including I.T.E. Land Classification groups 5 and 6 (Low Moorlands and Northern Uplands), but particularly groups 7 and 8 (Northern Lowlands and North-western Seaboard).

The use of 1970 as the divider year is unsatisfactory and a more recent year would be preferred. Except for the Priority Species, data for other species are generally only available using the 1970 divider, so this year must be used. Nevertheless, information has been used from the BWARS Newsletters so that recent changes in species statuses can be incorporated into the Archer statuses, e.g. *Philanthus triangulum* (Fab.) is no longer regarded as a High Quality Species.

Application of the new IUCN status definitions should bring about further changes in statuses of species of conservation concern particularly with the use of more recent information.

The Archer national statuses can be applied to the solitary species but probably only with caution to the social species. A colony or nest of a social species is not really the equivalent of a nest of a solitary species since there are many more individuals (hundreds to thousands) associated with a nest of a social species than a nest of solitary species. A few solitary bee species are communal species in that the females use a common entrance but provision their cells or nest independent of each other. A few "solitary" bee species of the genus *Lasioglossum* are really social species but the number of workers per colony are very few, usually less than ten. As such, the social species may be more readily found and could be given a lower status than is perhaps appropriate.

Table 3 shows the distribution of the British solitary species among the six statuses. Among the Low Quality species there are a similar number of Universal and Widespread species but fewer Restricted species. Among the High Quality species there are a similar number of Scarce and Very Rare species but fewer Rare species.

Table 3. The statuses of the British solitary wasps and bees.

Taxonomic Group	Universal	Widespread	Restricted	Scarce	Rare	Very Rare	Priority Species
Solitary Wasps							
Chrysididae	6	4	0	10	4	6	2
Tiphiidae	0	1	0	2	0	0	0
Mutillidae	0	1	0	2	0	0	0
Sapygidae	0	1	0	1	0	0	0
Pompilidae	11	6	0	10	6	6	2
Eumeninae	7	3	0	3	1	6	1
Sphecidae	0	1	0	2	1	0	0
Crabronidae	32	28	8	15	9	20	2
Total Solitary Wasps	56	45	8	45	21	38	7
Solitary Bees							
Colletinae	3	5	1	4	2	5	1
Andreninae	17	13	3	12	7	10	3
Halictinae	11	14	4	8	3	10	1
Melittinae	0	1	0	4	0	1	0
Megachilinae	6	10	2	4	2	9	4
Anthophorinae	8	8	3	3	8	8	3
Xylocopinae	0	0	0	0	1	0	0
Total Solitary Bees	45	51	13	35	23	43	12

Nearly half (48.5%) of the species are High Quality species. These are species that are at risk, or could become at risk, and need particular consideration for conservation. This percentage is similar to that for butterflies (Asher *et al.*, 2001) and perhaps is more serious as more species of aculeates than butterflies are involved.

Table 3 also shows the current distribution of Priority species among the solitary species. In addition, at present, there are eight ant Priority species and four bumblebee Priority species.

High Quality solitary species can have Universal, Widespread and Restricted distributions. The Restricted distribution is characteristic of the Very Rare (84.0%) and Rare (65.9%) species while the Scarce species mainly have a Widespread (52.5%) and Restricted (40.0%) distribution. The Universal distribution is shown by the Very Rare species *Pemphredon rugifera* (Dahlbom), the Rare species *Ceropales maculata* (Fab.) and *Lasioglossum quadrinotatum* (Kirby), and the Scarce species *Mutilla europaea* L., *Anoplius concinnus* (Dahlbom), *Crossocerus palmipes* (L.), *C. walkeri* (Shuckard), *Andrena nigriceps* (Kirby) and *Sphecodes ferruginatus* von Hagens.

The High Quality solitary species with Widespread and Restricted distributions are usually southern English species. The exceptions are the Restricted northern species *Chrysura hirsuta* (Gerstäcker), *Osmia inermis* (Zetterstedt) and *O. uncinata* Gerstäcker; the Widespread northern species *Crossocerus leucostomus* (L.), *Passaloecus monilicornis* Dahlbom, *Andrena ruficrus* Nylander and *Osmia parietina* Curtis; the Widespread coastal species *Colletes halophilus* Verhoeff and *C. marginatus* Smith; the Widespread western coastal species *Mimumesa littoralis* (Bondroit) and *Colletes cunicularia* (L.); the Widespread north-west coastal species *Colletes floralis* Eversmann; and the Widespread southern and western species *Andrena apicata* Smith.

Of the social species, the social wasps (Vespinae) have six species with a Universal distribution and three species with a Widespread distribution. *Vespula austriaca* (Panzer) has a Widespread distribution in northern and western Britain. For the bumblebees and honeybee (Apinae) there are 15 species with a Universal distribution, five species with a Widespread distribution and four species with a Restricted distribution. *Bombus distinguendus* Morawitz has a Restricted distribution in north-western Scotland. Both *Bombus monticola* Smith and *B. magnus* Vogt have Widespread distributions in north-western Britain.

The study of the distribution of the ants (Formicidae) is not yet complete particularly because of the recent discoveries of new species of *Myrmica* and *Lasius*. As a first approximation there are eleven species with Universal distributions, ten species with Widespread distributions, 24 species with Restricted distributions and two species, *Formica exsecta* Nylander and *F. sanguinea* Latreille with disjunct populations in northern and southern Britain. *Formica aquilonia* Yarrow (Restricted distribution) and *F. lugubris* Zetterstedt (Widespread distribution) are found in northern Britain while *F. lemani* Bondroit (Widespread distribution) is found in northern and western Britain.

Habitats of the high quality species

The UK Biodiversity Action Plan has divided habitats into 28 Broad Habitats in which are 45 Priority Habitats (http://www.ukbap.org.uk/habitats.aspx). The Broad Habitats are meant to be comprehensive as the following four Broad Habitats illustrate.

1. Boundary and Linear Features – includes hedgerows, walls, dry ditches, roads and railways with associated semi-natural habitat.
2. Arable and Horticultural – includes perennial woody crops and intensively managed orchards, commercial horticultural land, freshly ploughed land, annual leys, rotational set-aside and fallow.
3. Inland Rock – includes natural and artificial exposed rock surface almost lacking in vegetation, as well as various forms of excavations and waste tips. It also includes inland cliffs, ledges, caves, screes, limestone pavement, quarries and quarry waste.
4. Built-up areas and Gardens – includes urban and rural settlements, farm buildings, caravan parks, other man-made structures including industrial estates, retail parks, waste and derelict ground, urban parkland, transport infrastructure, gardens and allotments.

These four Broad Habitats have no Priority Habitats except for Limestone Pavement. However, some of them can be very important for aculeates, e.g. Post-industrial sites.

Besides the 205 High Quality solitary species, a further 19 ant (eight Priority species and six treated as Very Rare, two Rare and three Scarce species) and eight bumblebee (four Priority species and four treated as Scarce species) species (i.e. total 232 species), will be considered in allocating species to Priority Habitats. Because of the difficulty of separating the ant species *Tapinoma ambiguum* Emery and *T. erraticum* (Latreille), these two species will be considered together in any further analysis (Edwards & Telfer, 2001: 28). The Priority ant species are listed on the web site: http://ukbap.org.uk/ants.htm and the wasps and bees on the web site: http://ukbap.org.uk/SpeciesGroup.aspx?ID = 5.

Problems with four groups of species were encountered in trying to associate High Quality Species with Priority Habitats: aerial-nesting species with their aculeate parasites, species of non-Priority woodland, bumblebee species requiring open flowery habitats and species for which there is insufficient information.

Ten aerial-nesting species and their aculeate parasites could not be associated with any Priority Habitat. Three parasite species (*Omalus aeneus* (Fab.), *O. puncticollis* (Mocsáry), *Pseudomalus violaceus* (Scopoli)) are associated with dead wood nesting hosts which are often common and widespread species found in many open habitats. There is little information about four Very Rare species (*Chrysis longulus* Abeille de Perrin, *C. pseudobrevitarsis* Linsenmaier, *Nitela borealis* Valkeila, *N. lucens* Gayubo & Felton) except that they are found in a variety of open habitats. The remaining three species (*Gymnomerus laevipes* (Shuckard), *Ectemnius dives* (Lepeletier & Brullé) and *Stigmus pendulus* Panzer) at present can only be associated with open habitats.

Five species (*Priocnemis cordivalvata* Haupt, *P. susterai* Haupt, *Passaloecus eremita* Kohl, *Andrena congruens* Schmiedeknecht and *Nomada obtusifrons* Nylander) can only be associated with open areas in non-Priority woodland which by coincidence may be within in other Priority non-woodland Habitats. *Passaloecus eremita* is associated with pine trees but since it is, at present, restricted to south-eastern England it cannot be associated with Native Pine Woodland.

Bumblebee species require extensive long-lasting open flower-rich areas with some coarse vegetation areas for nesting either under leaf-litter or in small mammal burrows. In practice, the eight bumblebee species are associated with Priority Habitats although often with a large number of such Habitats.

For five species [*Philoctetes truncatus* (Dahlbom), *Chrysis schencki* Linsenmaier, *Anoplius concinnus* (Dahlbom), *Trypoxylon minus* de Beaumont, *Eucera nigrescens* Pérez] there is insufficient information to associate them with any Priority Habitat.

Subtracting these 20 species from the 232 species for consideration, 212 species are left to be associated with Priority and non-Priority Habitats. These 212 species can be associated with 22 Priority Habitats (Table 4) which are found in 16 Broad Habitats. Although Table 4 is a summary of current information it is unlikely to be complete. It is likely that more species will be associated with Lowland Dry Acid Grassland, Ancient and/or species-rich Hedgerows and Lowland Wood-Pastures and Parkland.

Five of the Priority Habitats (Major Priority Habitats) are particularly important for the High Priority Species. These are, in order of their importance with the percentage of considered species in brackets: Lowland Heathland (61.3%), Maritime Cliffs and Slopes (32.1%), Lowland Calcareous Grassland (26.9%), Coastal Sand Dunes (26.4%) and Lowland Dry Acid Grassland (14.6%). Harvey (pers. comm.) has made available a list of RDB and Nationally Scarce Species of Brownfield Sites. This list of 88 species including three Priority Species, equates, at least, for some Brownfield sites with the Major Priority Habitats for aculeates. Such Brownfield sites, known as Post-industrial sites, are now being considered as a potential Priority Habitat (Bodsworth *et al.*, 2005; Tucker *et al.*, 2005).

The other Priority Habitats (Minor Priority Habitats) have only 1–12 species associated with them. For the following, only one High Quality species can be associated with one Priority Habitat: *Crossocerus walkeri* (Shuckard) with Chalk Rivers, *Osmia parietina* with Limestone Pavement, *Bombus ruderatus* (Fab.) with Lowland Meadows, *Formica candida* Smith with Lowland Bog and *Pemphredon morio* Vander Linden with Wet Woodland. With the exception of *Crossocerus walkeri*, these species can be associated with two to four Priority Habitats. *Crossocerus walkeri* is associated with high quality water from which it obtains its

Table 4. The association of High Quality species with their Priority Habitats.

Priority Habitats	Priority Species	Very Rare Species	Rare Species	Scarce Species	Total Species
Ancient/Species-Rich hedgerows	0	3	0	3	6
Cereal Field Margins	1	1	0	5	7
Chalk Rivers	0	0	0	1	1
Coastal Flood Plains & Grazing Marsh	1	1	1	1	4
Coastal Saltmarsh	2	0	1	3	6
Coastal Sand Dunes	4	13	12	27	56
Coastal Vegetated Shingle	5	2	1	1	9
Fen	0	4	3	3	10
Limestone Pavement	1	0	0	0	1
Lowland Calcareous Grassland	6	15	13	23	57
Lowland Dry Acid Grassland	4	8	4	15	31
Lowland Heathland	12	33	32	53	130
Lowland Meadow	1	0	0	0	1
Lowland Raised Bog	1	0	0	0	1
Lowland Wood Pasture & Parkland	0	3	3	6	12
Machair	1	0	0	1	2
Maritime Cliff & Slopes	5	21	13	29	68
Native Pine Woodland	7	0	0	0	7
Reedbeds	0	3	2	1	6
Upland Calcareous Grassland	3	0	0	0	3
Upland Heathland	0	1	1	3	5
Wet Woodland	0	0	0	1	1

prey of mayflies. As such, it could be associated with other high quality waters. It nests in dead wood which is found in open areas and presumably near to its prey source.

There is very little evidence associating High Quality species with Ancient/species-rich Hedgerows, Cereal Field Margins and Lowland Wood-Pasture and Parkland which indicates that more recording needs to be carried out in these habitats.

Another problem in associating a High Quality species with a Priority Habitat is that the literature often only refers to the micro-habitats in which the species find its resources that it needs. These six resources are nesting, foraging, overwintering, sunning and mating sites and building materials. If only information about micro-habitat information is available some interpretation was necessary in associating a species with a Priority Habitat.

In general terms, the usual characteristics of Priority Habitats for High Quality Species are terrestrial, lowland and open habitats. Exceptions are for Fen (*Odynerus simillimus* Morawitz, *Macropis europaea* Warncke), Reedbeds (*Passaloecus clypealis* Faester, *Hylaeus pectoralis* Förster), Upland Calcareous Grassland (*Chrysura hirsuta, Osmia inermis*) and Upland Heathland (*Mutilla europaea, Bombus monticola*). *Mutilla europaea* is also associated with Lowland Heathland.

A habitat specialist is a species which finds all its resources in one habitat. Such habitat specialists could be used as indicators of their habitats. Table 5 shows the number of Priority, Very Rare, Rare and Scarce species that are associated with one or more Priority Habitats. As noted previously some High Quality species cannot be associated with a Priority Habitat. Table 5 also shows whether species associated with one Priority Habitat are also associated with non-Priority Habitats. Thus of the

Table 5. Habitat associations of the High Quality species

Species Group	One Priority Habitat Only	One Priority & Non-Priority Habitats	More than One Priority Habitat	Not Placed
Priority	12	9	10	0
Very Rare	15	17	30	7
Rare	4	7	30	4
Scarce	4	17	57	9

species that can be associated with only one habitat (i.e. one Priority Habitat only), these include 12 Priority Species (37.8% of Priority species), 15 Very Rare species (24.2% of Very Rare species), four Rare species (9.8% of Rare species) and four Scarce species (5.1% of Scarce species). Generally, the rarer the species the more likely it is to be associated with one Priority Habitat. Table 6 lists the 35 High Quality Species with their sole associated Priority Habitat.

A limitation of specialist High Quality species being Indicator species is that often such species have a limited British distribution. Thus *Colletes halophilus* is restricted to the saltmarshes of south-east and eastern England, *C. floralis* to sand dunes of north-west England and western Scotland, *Melitta dimidiata* Morawitz to lowland calcareous grasslands of Salisbury Plain, *Chrysis fulgida* L. to lowland heathland of Surrey and Hampshire, *Lasioglossum angusticeps* (Perkins) to maritime slopes and cliffs of central southern England and *Osmia inermis* to upland calcareous grassland of Scottish Highlands. The four Scarce species are more widely distributed but are still restricted to south-east England and East Anglia.

Parasitic and non-parasitic species

The aculeate solitary species can be divided into those species that provide a food source for their offspring (non-parasitic species) and those species whose offspring either live off the food resource of their host species (cleptoparasites) or feed on the fully grown pre-adult stage of their host (parasitoids). Three species, *Tiphia femorata* Fab., *T. minuta* Vander Linden and *Methocha articulata* Latreille are parasitoids on non-aculeates and will not be further considered.

Although proportionally there are slightly fewer parasitic wasps (21.1% of solitary wasps) than parasitic bees (27.0% of solitary bees) parasitic and non-parasitic species are relatively equally distributed among the solitary bees and wasps ($2 \times 2\ \chi^2 = 2.04$, $P = 0.15$). However, parasitic species are relatively more likely to be High Quality species than Low Quality species ($2 \times 2\chi^2 = 6.53$, $P = 0.01$) indicating that High Quality parasitic species are the group of solitary species most at risk and threatened. Since there are 60 High Quality parasitic species there is a real problem in just monitoring these species.

Concerning the social species, eight species of social wasps (Vespinae) are non-parasitic and one species, *Vespula austriaca*, is an obligate social parasite of *V. rufa* (L.). Among the social bees (Apinae), 18 species are non-parasitic and six species are obligate social parasites, usually each species on one host species. Among the ants, 36 species are non-parasitic, five species are temporary social parasites, five species are obligate social species, one species (*Formica sanguinea*) is a facultative slave-maker

Table 6. Priority (P), Very Rare (VR), Rare (R) and Scarce (S) species restricted to only one Priority Habitat – the habitat specialists.

Priority Habitat	Associated species with status in brackets
Coastal Saltmarsh	*Colletes halophilus* Verhoeff (S)
Coastal Sand Dunes	*Evagetes pectinipes* (L.) (P), *Colletes floralis* Eversmann (P), *Myrmica specioides* Bondroit (VR), *Arachnospila consobrina* (Dahlbom) (VR), *Miscophus ater* Lepeletier (VR), *Colletes cunicularis* (L.) (VR), *Coelioxys mandibularis* Nylander (VR).
Lowland Calcareous Grassland	*Halictus eurygnathus* Blüthgen (VR), *Nomada armata* Herrich-Schäffer (P), *Melitta dimidiata* Morawitz (VR).
Lowland Dry Acid Grassland	*Miscophus bicolor* Jurine (VR).
Lowland Heathland	*Chrysis fulgida* L. (P), *Formica rufibarbis* Fab. (P), *Myrmica karavajevi* (Arnol'di) (VR), *Homonotus sanguinolentus* (Fab.) (P), *Pseudepipona herrichii* (de Saussure) (P), *Eumenes coarctatus* (L.) (S), *Ceropales variegatus* (Fab.) (VR), *Evagetes dubius* (Vander Linden) (R), *Mimumesa spooneri* (Richards) (VR), *Andrena argentata* Smith (R), *Andrena nigrospina* Thomson (R), *Lasioglossum sexnotatum* (Kirby) (VR), *Lasioglossum brevicorne* (Schenck) (S), *Lasioglossum prasinum* (Smith) (S), *Nomada baccata* Smith (R).
Maritime Cliffs	*Mimumesa atratina* (Morawitz) (VR), *Lasioglossum angusticeps* (Perkins) (P), *Lasioglossum laticeps* (Schenck) (VR), *Osmia xanthomelana* (Kirby) (P), *Nomada errans* Lepeletier (P), *Nomada conjungens* Herrich-Schäffer (VR).
Native Pine Woodland	*Osmia uncinata* Gerstäcker (P).
Upland Calcareous Grassland	*Osmia inermis* (Zetterstedt) (P).

and one species (*Formicoxenus nitidulus* (Nylander)) is a guest in the nest of another ant *Formica* species.

Nest-site characteristics

The nest-site characteristics of the non-parasitic species can be roughly divided into aerial and subterranean nesters. Aerial nesters use old beetle burrows in dead wood, central plant stem cavities, e.g. bramble, or exposed on the surface of rock or other hard surface, e.g. *Ancistrocerus oviventris* (Wesmael). Subterranean nesters can be further divided into true subterranean nesters, subterranean surface nesters and pompilid cavity nesters. True subterranean nesters nest in the soil usually in burrows dug by them. Subterranean surface nesters nest under stones, e.g. *Osmia inermis*, in snail shells, e.g. *Osmia aurulenta* (Panzer), *Hoplitis spinulosa* (Kirby), or in leaf litter, e.g. *Bombus pascuorum* (Scopoli). Pompilid subterranean cavity nesters nest in a variety of ready-made cavities including those under stones and in snail shells, e.g. *Anoplius nigerrimus* (Scopoli), or in the burrow of their spider prey, e.g. *Aporus unicolor* Spinola. Besides some pompilids, species of *Osmia* [e.g. *O. rufa* (L.)] and *Megachile* [e.g. *M. centuncularis* (L.)] are often cavity nesters using aerial, surface and subterranean sites. In these cases a species is allocated to the nesting site that is particularly characteristic of the species.

The nesting sites of solitary species are given in Table 7. The nesting characteristic of one species, *Mimumesa spooneri* (Richards), is unknown. The solitary wasp species

Table 7. Nest-site characteristics of solitary wasp and bee species.

	Aerial	Subterranean
Wasps	79	85
Bees	29	125
Low Quality Species	67	109
High Quality Species	41	101

are approximately equally divided between aerial and subterranean nesters, while 81% of solitary bee species are mainly subterranean nesters. A 2×2 χ^2-test shows not only the importance of subterranean nesting for the solitary bees (more subterranean nesters than expected by chance) but also the importance of aerial site nesting for the solitary wasps (more aerial nesters than expected by chance) ($\chi^2 = 30.5$, $P < 0.001$). The High and Low Quality Species are relatively equally likely to be aerial or subterranean nesters ($\chi^2 = 3.0$, $P = 0.09$).

The importance of aerial sites for solitary wasps is probably related to weather factors. Lomholdt (1975) showed that the aerial nesting frequency increased with increasing latitude for Sphecidae (28% in France and 79% in northern Norway). At higher latitudes average temperatures and amounts of sunshine would be reduced so that increasingly aerial sites are likely to warm up quicker and be warmer for a longer time than subterranean sites. The percentage of aerial-nesting British solitary wasps is 48% which is intermediate, as expected from its geographical position, for the above two localities. Archer (1990) found that the amount of activity of solitary wasps was more clearly related to summer weather than for summer solitary bees. The lower dependence of solitary bees on summer weather may partially explain their increased use of subterranean sites although other reasons for this preference need to be explored.

Concerning social wasps (Vespinae), four species are aerial nesters and three species are predominantly subterranean nesters. *Dolichovespula sylvestris* (Scopoli) often nests in earth cavities at or near soil surface although it frequently nests aerially in bird boxes. Among the social bees (Apinae), eight species are subterranean nesters, five species nest at the surface of the ground among leaf litter, two species are aerial nesters and three species, although mainly subterranean nesters, also use aerial sites. The ants (Formicidae) are mainly associated with the soil either nesting underground (five species), at the surface of the ground under cover, e.g. a stone, (15 species) or may nest underground or at the surface of the ground under cover (18 species). One species (*Leptothorax acervorum* (Fab.)) can nest underground or at the surface of the ground and three species (*Lasius brunneus* (Latreille), *L. fulginosus* (Latreille), *Temnothorax nylanderi* (Foerster)) are aerial nesters.

Adult activity

Figure 1 shows a plot of the number of species of solitary wasps and bees versus the months (March-October) in which they are active as adults. The solitary bees show a gradual increase in species numbers from March, reaching a maximum value during June, after which they gradually decrease. The solitary wasps, by way of contrast, delay their increase until May, reaching a maximum value during July, after which they decrease. The number of solitary wasp species is similar from June until

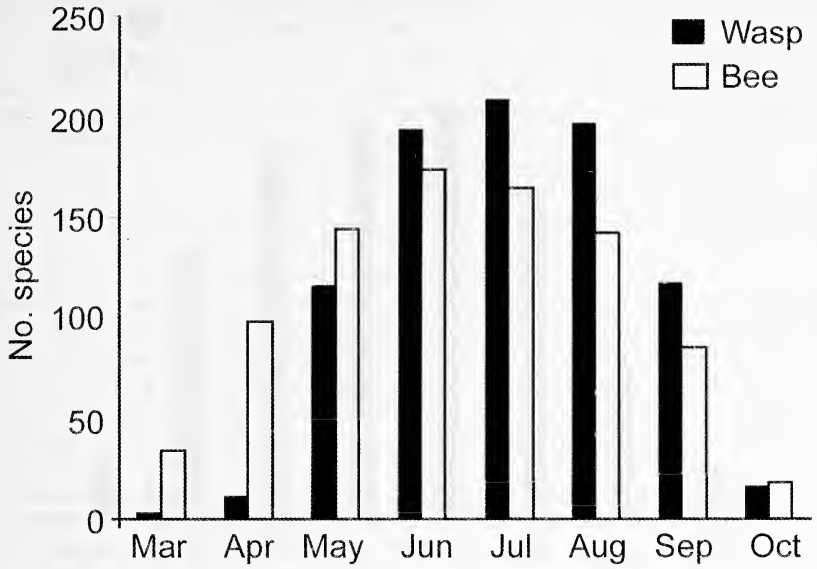

Fig. 1. The number of solitary wasp and bee species versus the months in which they are active as adults.

August while the number of solitary bee species is similar for an extra month, from May until August.

Most solitary wasp species, as already indicated, are summer species with a few species active during March or April, e.g. *Anoplius viaticus* (L.), *Priocnemis perturbator* (Harris), *P. coriacea* Dahlbom, *P. susterai* and several species of *Ancistrocerus*. In contrast, the solitary bee species can be early spring, spring, summer, late summer, autumn and double-brooded species. The adult activity of early spring species ends during April or May, e.g. *Colletes cunicularis, Andrena clarkella* (Kirby), *A. praecox* (Scopoli) and *A. ruficrus*. Spring species are active from April until June, e.g. *Andrena fucata* Smith, *A. fulva* (Müller *in* Allioni), *A. haemorrhoa* (Fab.), *A. synadelpha* Perkins, *Anthophora plumipes* (Pallas), *A. retusa* (L.) and the *Melecta* cleptoparasites of these *Anthophora* species. Like the solitary wasps, most solitary bees are summer species, typically being active from May until August, but may be present before and after these months, e.g., *Hylaeus, Andrena* (*A. tarsata* Nylander, *A. marginata* Fab., and *A. coitana* (Kirby)), *Panurgus, Dasypoda, Macropis,* Megachilinae and *Ceratina*. Late summer species are active from July or August until October, e.g. *Colletes succinctus* (L.), while autumn species are active during September and October, e.g. *Colletes hederae* Schmidt & Westrich. Double-brooded species include those species with a spring and summer brood, e.g. *Andrena bicolor* Fab. and *A. trimmerana* (Kirby), and those species with an over-wintered fertilized spring female presence followed by a new generation of females and males, e.g. *Halictus, Lasioglossum* and their cleptoparasites, *Sphecodes* spp. *Andrena rosae* Panzer was previously considered a double-brooded species but its spring form is now given species status as *A. strangulata* Illiger. The cleptoparasitic *Nomada* are generally active during the same months as their hosts *Andrena*.

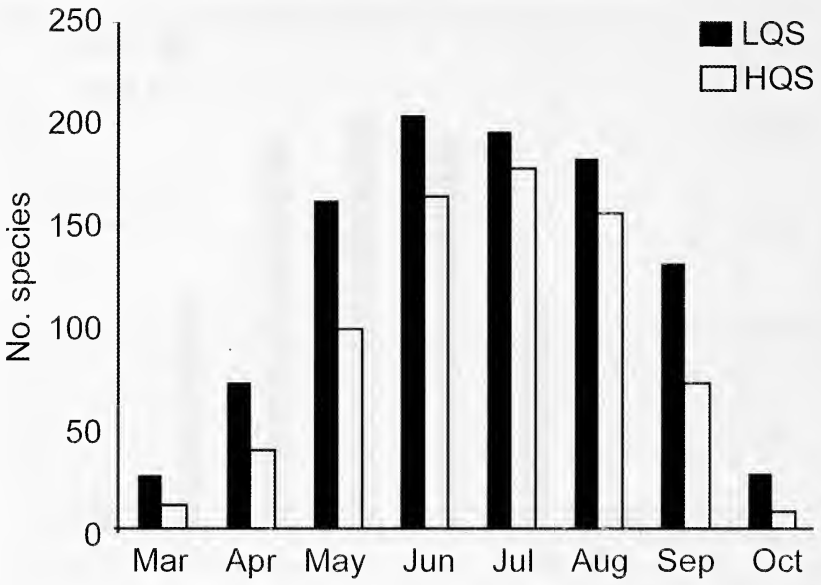

Fig. 2. The number of Low and High Quality Species versus the months in which they are active as adults.

Figure 2 shows a plot of the number of Low and High Quality species of solitary wasps and bees versus the months (March–October) in which they are active as adults. The Low Quality species are always more numerous than the High Quality species. This difference is not just a reflection of the greater number of Low Quality species (218 species) versus High Quality species (205 species) since the Low Quality species usually exceed the High Quality species by more than 13 species. Since High Quality species are rarer than Low Quality species they are less likely to be found so that the recorded months of adult activity are likely to be fewer.

Concerning the social species, the ants (Formicidae) have perennial colonies and the adults become active under favourable weather conditions. The sexuals are usually present and mate during July and August although a few species are earlier, during May or June, and a few later during September and October.

The social wasps (Vespinae) have an annual life cycle. The spring queens emerge from overwintering sites during March and April. Three species have long colony cycles with successful colonies usually terminating during October or early November while six species have short colony cycles usually terminating during August or early September. Most species of bumblebees (*Bombus*) have annual life cycles although *B. hortorum* (L.), *B. jonellus* (Kirby), *B. lucorum* (L.) and *B. pratorum* (L.) may be double brooded each year and *B. terrestris* (L.) may overwinter. Depending on the species, spring queens emerge during March, April or May and successful colonies terminate from August until November.

Food resources

The food resources are pollen for the bees, prey for the wasps and hosts for the parasitic species. In addition, all species need an energy food source which is often

nectar. These food resources can become critical to the existence of a species where a bee species limits its pollen source to one or a few related flower species (oligolectic bees), a wasp species only takes a limited number of prey species, a parasite species is dependent on a single host species and a bumblebee species with a long life cycle needs a continuous supply of pollen sources throughout its cycle.

Much more information is needed on food resources but already some information is available. For example, among the oligolectic solitary bees *Colletes cunicularis* obtains pollen from *Salix repens* L., *Hylaeus signatus* (Panzer) from *Reseda, Andrena florea* Fab. from *Bryonia dioica* Jacq., *Halictus eurygnathus* from *Centaurea scabiosa* L. and *C. nigra* L. and *Macropis europaea* Warncke from *Lysimachia vulgaris* L. Among the solitary wasp species *Homonotus sanguinolentus* (Fab.) preys upon the spider *Cheiracantheum erraticum* (Walckenaer), *Pseudepipona herrichii* (de Saussure) preys on larvae of the moth *Acleris hyemana* Haworth and *Crossocerus walkeri* preys on mayflies usually of the family Baetidae. Among the parasitic species *Hedychridium roseum* (Rossi) is dependent on *Astata boops* (Schrank), *Chrysis fulgida* on *Symmorphus crassicornis* (Panzer), *Anergates atratulus* (Schenck) on *Tetramorium caespitum* (L.), *Vespula austriaca* on *V. rufa* and *Bombus rupestris* (Fab.) on *B. lapidarius* (L.). Nisbet (2004) & MacDonald and Nisbet (2005) have found that *Bombus monticola* in the Central Highlands of Scotland is mainly dependent for pollen resource from *Vaccinium myrtillus* L. from April until mid-June, followed by *Lotus corniculatus* L. until early July and *Erica cinerea* L. and *Trifolium repens* L. until the end of September.

Monitoring

Monitoring is an attempt to determine the presence and abundance of a species or an assemblage of species at a particular site over a period of several years. Hopefully changes in abundance of species can be related to some environmental factor. Alternatively, the effect of a management change can be studied by effects on a species or assemblage.

Waloff & Blackith (1962) monitored the growth and distribution of mounds of *Lasius flavus* (Fab.) over eight years. They were able to relate the death of colonies to changes in vegetation. Archer (1985, 2001) monitored the abundance of *Vespula germanica* (Fab.) and *V. vulgaris* (L.) for up to 27 years at various sites, finding in the first part of the study a two-year cycle of abundance driven by the behaviour of the social wasps themselves. During the second part of the study a dramatic decrease of abundance from the late 1970s to the early 1980s was found to be probably caused by the increased use of pesticides.

Surveys of single species are often concerned with finding the resource requirements for that species. Roberts & Else (2000) found that the mason wasp, *Pseudepipona herrichii*, needed a clay soil in which to make a nest, a nearby water resource to help in moulding the clay and caterpillars of the tortricid *Acleris hyemana* as a prey resource for its larval offspring. These caterpillars are found on the early and mid-succession stages of bell heather whose flowers were also used as a nectar resource by the adult wasps. This discovery of the prey resource has implication for the management of bell heather to maintain continuously the presence of early and mid-succession stages.

Archer (1990) reported on an assemblage of solitary wasp and bee species found in a suburban garden over a 12 year period which has now been extended to 27 years. During this time there has been an overall decrease in the abundance of all species. Dividing the species assemblage into three groups, spring and summer bee and wasp

species, the decrease in abundance was mainly due to the loss of summer bee abundance. The reasons for this decrease have yet to be investigated.

A recent management change at Shotover Hill, Oxford successfully provided additional nesting sites for subterranean nesters. Four shallow bays were excavated, providing a bare sandy surface with the scraped material piled up to give a vertical bank of about 30cm in height. The scrapes were rapidly colonised by 46 solitary wasp and bee species with their attendant 21 species of parasites (Conservation Management Advice, British Wildlife, 2005).

The methods that can be used to carry out monitoring are very varied. (i) Counting individuals or their artefacts: Sudd *et al.*, (1977) counted mounds of the wood ant, *Formica lugubris* Zetterstedt, and Waloff & Blackith the mounds of the yellow ant, *Lasius flavus*. Brian (1972), using mark-and-recapture, estimated the number of workers in colonies of *Myrmica sabuleti* Meinert. Archer (1984) counted the nest mounds of *Andrena clarkella*, finding 308 mounds in 360 sq.ft. (about 33.5 m^{-2}). Counts of individuals could also be made at flowers, e.g. *Colletes hederae*, or species making characteristic aerial nests, e.g. the use of the 'cigar galls' of *Lipara lucens* Meig. by *Passaloecus clypealis* and *Hylaeus pectoralis*. Walking a predetermined route under specified environmental conditions could be used to monitor bumblebees. (ii) Trapping techniques: Archer (1980, 1985, 1990, 2001) used Malaise, suction and baited traps to monitor social wasp abundance. Free & Williams (1970) explored the use of aerial artificial nests for *Osmia rufa* with success and also were able to study, from the pollen brought back to the nest sites, the flowers that had been visited. Corbet & Backhouse (1975) used beetle holes in pine boards to study the habits of three species of *Passaloecus* and Danks (1971a, 1971b) used dead bramble stems to study several solitary wasp and bee species but especially *Pemphredon lethifera* (Shuckard) and *Hylaeus brevicornis* Nylander.

Good and bad management of habitats for aculeate species

It is possible to give much general advice on good and bad practice of managing habitats for aculeates although little information is available of the consequences of good and bad management (Falk, 1991; Fry & Lonsdale, 1991; Kirby, 1992; Sutherland & Hill, 1995).

In general terms, habitats such as coastal sand dunes, salt marshes and maritime cliff and slopes should be maintained in their natural unimproved state, only using low-level grazing where necessary. Traditional management of grasslands and heathlands should be maintained. Grasslands should only be subject to low-level grazing to keep the habitat open and maintain large flower-rich areas. Traditional rotational burning of heathlands should be continued and to avoid summer fires, fire-breaks should be maintained. Generally on open habitats management activities should be taken to control scrub encroachment and woodland succession. The public use of habitats should be monitored and controlled if necessary. On lowland heathlands horse riding is usually restricted to bridleways and motorcycle activity banned. On coastal sand dunes the public may be controlled by the use of boardwalks and fencing. Traditional management of hedgerows should be continued with layering and keeping the bottoms fully exposed to the sun. The water levels of wet habitats, such as reed beds, fens and lowland raised bogs, should be maintained at a high stable level. Flower-rich grasslands should be maintained next to coastal shingle habitat.

Some other good management practices are the maintenance or creation of bare patches of soil either on the flat or as slopes and banks and keeping the areas around

such bare patches open by preventing vegetation growth. Dead wood in sunny situations should be retained for aerial nesters as well as patches of vegetation with dead pithy stems such as *Rubus* and *Rosa*. Patches of coarse vegetation, including taller grasses, should be retained in drier areas so that leaf litter layer accumulates.

Bad management is usually the cause of loss of habitat, removal of aculeate resources or adverse general public activities. Quarrying, afforestation, particularly coniferous afforestation, and urban and industrial building developments result in habitat loss on a large scale. Agricultural intensification, including the use of fertilizer and pesticides, improvement of drainage and hedgerow removal, has a severe impact on habitats. Sea defences can lead to the loss of coastal sand dunes and saltmarshes and stabilization of maritime cliffs and slopes prevents the natural regeneration of unstable surfaces. Some of these changes increase the level of environmental pollution. Neglect of habitats can be treated as bad management where it results in scrub encroachment and woodland succession so that open habitat is lost. Cleaning up a habitat, by removing dead wood and dead woody stems destroys aerial nesting sites. Public activities can lead to summer fires, erosion of soil by excessive disturbance by horse-riding, motorcycling or walking and bank erosion by wave action from boats.

When the specific requirements of a species are known then these resources can be provided or maintained. Pollen resources can be provided for the oligolectic bees, *Bryonia dioica* for *Andrena florea*, *Salix repens* for *Colletes cunicularis* and *Scabiosa columbaria* L. with *Knautia arvensis* (L.) for *Andrena hattorfiana* (Fab.). *Macropis europaea* requires *Lysimachia vulgaris* for pollen and nectar resources. *Populus* and *Salix* provide the prey needed by *Symmorphus connexus* (Curtis) and *S. crassicornis*, the latter being the host for *Chrysis fulgida*. *Argogorytes fargeii* (Shuckard) requires herb-rich areas with tall grasses from which it obtains prey for its offspring. The resource requirements of a species may seem, at times, to be in conflict with the management of a Priority Habitat. The Priority species, *Chrysis fulgida*, found on Lowland Heaths, via the food resource need of its host, requires the presence of *Populus* and *Salix*. *Populus* and *Salix* may not be regarded as a component of Lowland Heaths and be removed which could lead to the loss of *C. fulgida*. This example emphasizes the need to determine the resource needs of High Quality Species (Archer, 2005).

Conclusions

The study of British aculeate species which started in the nineteenth century has continued to the present resulting in ever expanding information on the habits and habitat associations of species. A relatively recent development has been a concern for aculeate conservation particularly with the discovery that nearly half of the species are at risk, or could be at risk, of local or total extinction. This concern has resulted in the need to give each species a quality status with the requirement to keep these statuses up-to-date by field-work, literature searches and the study of museum specimens.

The species of most conservation concern, here called High Quality species, can usually be associated with Priority Habitats, but few of these species are indicators of particular Priority Habitats. It would seem that that the resource needs of most aculeate species can be found in a range of open habitats. As such, it is necessary first to define the resource needs of a species before attempting to associate a species with a Priority or Broad Habitat.

The non-parasitic solitary wasps are characteristically associated with aerial-nesting sites and summer adult activity while, in contrast, the non-parasitic solitary bees are characteristically associated with subterranean-nesting sites and spring, summer and autumn adult activity. These differences may be linked to the solitary wasps' greater dependence on warmer weather conditions. The generally larger body size of solitary bees compared with solitary wasps may enable the solitary bees more easily to maintain the body temperature necessary for activity in cooler conditions.

The monitoring and habitat management for aculeate species would seem to be in its infancy. Research in these areas can bring benefit to aculeate populations as shown at Shotover Hill, Oxford. Research needs to investigate the resource needs of each species before applying beneficial habitat management changes. Such information may also allow a balance to be obtained between the needs of species and habitat conservation.

Acknowledgment and caution statement

The author is grateful for the help of D. Baldock who made useful suggestions on reading this paper. He informs me that *Crossocerus congener* should now be considered a resident species as it has been found on six sites in Middlesex and Hertfordshire. Since species status and their habitats may change with new information on distribution, the data in this paper are only a snapshot of the current situation as known by the author.

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SHORT COMMUNICATION

Some records of *Pteromalus leucanthemi* Janzon (Hymenoptera: Pteromalidae) from Kent. – On 21.vi.2004 I collected some flowerheads of *Leucanthemum vulgare* Lam. from Kemsing, Kent (TQ5559). Further collections were made on 1.vii.2004 from Shorne (TQ6873) and Higham (TQ7074). Many of the flowerheads were infested with larvae or pupae of *Tephritis neesii* (Meigen) (Diptera: Tephritidae). The flowerheads were placed in a well-ventilated and shaded garden shed. Imagines of *T. neesii* emerged between 30.vi.–3.vii.2004. From the collection made at Kemsing one male *Pteromalus leucanthemi* Janzon emerged on 30.vi.2004, one male and one female on 10.vii.2004 and three females emerged between 13.vii–15.vii.2004. From the collection made at Shorne one male *P. leucanthemi* emerged 5.vii.2004 and from those collected at Higham one male emerged 15.vii.2004.

Pteromalus leucanthemi is known as a primary parasitoid of *T. neesii* and was first recorded in Britain from material collected from Egham, Surrey in 2001 by Polaszek, Aplin, Brown and Gange (2004, *British Journal of Entomology and Natural History*, **17**: 45–49).

The specimens of *P. leucanthemi* have been deposited in the collections of R.R. Askew, whom I thank for their identification.–M.T. JENNINGS, 206 Lower Higham Road, Gravesend, Kent, DA12 2NN.

COUNCIL AND OFFICERS' REPORTS FOR 2006

Council's Report 2006

The Society's Council of twenty elected and six co-opted members met on seven occasions during the year at the rooms of the Royal Entomological Society with, on average, thirteen members attending each meeting.

The Council approved thirty applications for membership but had to strike-off twenty-six members for non-payment of their subscriptions. Sixteen members resigned and these included four members of long-standing as well as some who had only recently joined. We are particularly sorry that one of our Special Life Members, of sixty years standing, felt he had to resign as failing eyesight meant that he could no longer enjoy his entomology. It is with sadness that we have to announce that the deaths of five members have been reported to the Society in 2006. The deaths include those of two Special Life Members. On a more positive note, six members, C.I. Carter, E.W. Groves, S.F. Imber, H.A. Kennard, P.H. Langton and B.F. Skinner, completed fifty years continuous membership at the end of the year and the Council was pleased to elect them Special Life Members. Our Special Life members are the best advertisement we have of the benefits of membership of the Society. They make up nearly 5% of the total membership. As a result of all these changes, membership stood at 876 at the end of the year, a net decrease of 17 on the previous year. We predicted last year that a decrease could be expected as a result of the increase in the subscription rate. Hopefully there will be no further resignations because of this but, unfortunately, some members express their dissatisfaction with subscription rises by simply not paying their subscriptions. The striking-off process means that some of these are still in the system and so a further decrease in membership might be expected in 2007. We would suggest that the subscription to this Society represents remarkably good value when compared to that of other national societies and entomological journals. Where else do you get a journal, a library, collections, workshops, lectures and field meetings? Even the Royal Entomological Society at twice the price cannot compete.

In the early part of the year the Council spent some time considering the members' response to the questionnaire circulated the previous year. The May Council meeting was devoted to a discussion of the way forward following the members' suggestions. A number of the members find the *Journal's* contents too formal or not related to their interests. In response to the former the Council decided it should continue with the current type of content as it reflected well on the Society but that it should also develop a house journal or newsletter alongside the current *Journal*. This less formal publication would contain items of topical and practical interest as well as Society news. A small group is now considering how this idea can be advanced. On the matter of content the Editor is constrained by the material he receives for publication. There is a lot of competition for this material but authors may like to consider that, with a circulation of around 1000, an article published in the Society's *Journal* will be seen by more readers than if it was to be published in some other periodicals.

As members of a national Society, many respondents felt left out by activities, workshops and lectures that are centred in the south-east of England. We decided we should act upon this immediately by introducing meetings in other regions. To attract a broader audience, these would be day meetings with a number of speakers and some additional activity. The first of these meetings was held at the National

Museum of Wales in Cardiff in December, the second was held at the University Museum in Oxford in January 2007. The number of lecture meetings in London will be reduced to two per year. All day meetings do, of course, require a considerable input by those organising them and so we hope they will be well attended.

We were, perhaps, surprised that a clear majority of respondents to the questionnaire favoured limited trading at the Annual Exhibition. The Council decided, therefore, to experiment by inviting Ian Johnson of Pemberley Books to bring his stand to the exhibition. The experiment appears to have been a success both from our members' and from Mr Johnson's point of view. We anticipated a few complaints from members but are aware of none. We intend to repeat the experiment next year. In choosing Pemberley Books the Society's criteria were that the trader should be a member of the Society and that he should be able to provide books to suit the wide range of our members' interests. If the idea remains a success then we will in two or three years' time review the possibility of inviting an equipment dealer as well. Other proposals, such as setting up an identification panel for members, are still under discussion. We hope you will agree that your suggestions are being acted on.

News of the proposed closure of four research stations of the Centre for Ecology and Hydrology (CEH), including those most concerned with entomology, was received early in the year. The likely impact of these closures on research in entomology and conservation alarmed the Society. The Natural Environment Research Council (NERC), the instigator of the closures, invited public consultation and the Society responded with a letter setting out our views of the likely disadvantages of the closures. Our letter was based on an initial draft by Dr Malcolm Smart of Dipterists Forum and was signed by our affiliated societies, BMIG, BWARS and Dipterists Forum. A similar letter was sent to DEFRA, the DTI and the MPs for those sites threatened with closure. Ours was one of an unprecedented number of letters sent by similar organisations and individuals in protest at the closures. The response from NERC made it clear they would proceed regardless of the consultation and in due course the closures were confirmed although we understand that the number of redundancies has been reduced. The effect on the scientific programme of CEH remains to be seen.

Following a request from Butterfly Conservation (BC) to help provide financial support for their application to the Heritage Lottery Fund (HLF) for funding for the National Moth Recording Scheme (NMRS), the Council agreed to give a grant of £2000 to the NMRS. This brought forward an agreement to provide grants from the Society's Maitland Emmet BENHS Research Fund once the NMRS was under way and so this was money already earmarked for the NMRS. Butterfly Conservation's application to the HLF proved successful and the scheme will commence in 2007. The Hon. Secretary represents the Society on the NMRS steering group and a number of other members are also involved. The Society awaits a claim from Butterfly Conservation for payment of the grant.

As forecast last year the number of Indoor Meetings was reduced in 2006 and only five were held. The four held in London, including the joint meeting with the London Natural History Society (LNHS), attracted an average audience of just fifteen; around fifty attended the all day meeting in Cardiff. As we have already indicated, London meetings will be further reduced to two in 2007, the AGM and the joint meeting with the LNHS. The eighteen open days had an average attendance of eleven and remain popular. The doubts about the future availability of the Loddon Room meant that only three workshops were planned for 2006 and each was fully or nearly fully subscribed. The problem of the availability of the Loddon Room appears to

have been resolved in the short term and so a full workshop programme should be available in 2007. Our thanks must go to Ian McLean for organising these meetings, to Mike Wilson for the Cardiff meeting and to Peter Chandler for opening the rooms on most Open Days. With members travelling to Dinton Pastures from as far apart as Cornwall and Fifeshire then, for those interested in reducing their carbon footprint, it is worth remembering that our rooms are and will remain accessible by public transport. Paul Waring is again to be congratulated for arranging a varied programme of twenty-nine field meetings from Cumbria to the Isle of Wight. Field meetings cannot take place without someone to lead them and we are grateful to all the leaders for sharing their knowledge and time. The Field Meetings Secretary is always pleased to have offers to lead meetings, especially if they are from outside the southern half of England.

There has already been a brief mention of the Annual Exhibition but it needs to be put on record that this year 232 members and visitors recorded their presence by signing the visitors book, an increase of thirteen compared with 2005. There was a welcome increase in the number of exhibits this year; this might have been a reflection of an exceptionally good year for migrant species. Richard Jones who has been the exhibition photographer for the last few years has found himself too busy to continue. We thank him for his contribution to previous exhibition reports; putting other members' prize specimens in the best light is not always easy. We were very grateful to Jeff Higgott for taking on this rather exacting role this year. Around forty members and their guests sat down for the Annual Dinner which followed the Exhibition. As always our thanks go to Mike Simmons for ensuring that the day went smoothly.

The absence of any publications this year has meant that our Sales Secretary, Gavin Boyd, has had a quiet year but the reduction in the cash flow generated by publication sales is beginning to have an effect on the Society's affairs. Our Building Manager, Martin Albertini, has also had a quiet first year in the job but in this case it is to be welcomed. Visitors to the Pelham-Clinton Building may have noticed that there have been some problems with the lighting. These are of an intermittent nature and may only be resolved if some of the light fittings are replaced.

This report will be the last to be read out under this impressive ceiling, as the Royal Entomological Society has decided to move to Hertfordshire. We have held our Indoor Meetings here since 1990 when we had to leave the rooms of the Alpine Club in South Audley Street and a few years later we moved our Council meetings here from Baden-Powell House. New venues will have to be found. We would like to thank the Royal Entomological Society for their cooperation and hospitality over these years and, in spite of what as individuals we may think of the wisdom of their move, to wish them well in their new location. It is, perhaps, a good time for us to be more evangelical about our own Society.

JOHN MUGGLETON

TREASURER'S REPORT
FINANCIAL YEAR TO 31 DECEMBER 2006

In last year's report I suggested that 2006 would see the result of increasing subscription and the inevitable loss of membership that results. At first glance the increase in subscription income from £12,088 to £14,933 seems to justify the increase, but it should be borne in mind that a greater proportion of members than usual had paid for 2007 in advance this year. There was also a significant increase in the work

load for Roger Hawkins in dealing with more suspensions and strikings off than usual and in particular persuading members to correct their standing orders to £19; some 570 letters in all.

In other ways the year has followed the pattern of 2005 rather closely. We did not have a new publication to sell and our sales income continued in the doldrums as a result. Costs continued to rise with the noticeable exception of the *Journal*, where John Badmin has kept expense down. We incurred a cash deficit overall of £7,514 and this was counter balanced by an increase in market value of our investments by £27,043. Until our year end the financial markets had enjoyed a continuing good year but events of the last few days have signalled that this growth may be checked. Never the less, the Society remains financially sound and able to finance its on going programme. In February 2007 a bond matured and we currently hold cash from that of some £22,000 on deposit pending developments on the stock exchange and at Dinton Pastures.

I extend special thanks to Roger Hawkins and John Flynn for dealing with day to day matters throughout the year in their roles of Assistant and Deputy Treasurer, I have already indicated the heavy work load Roger has had this year. My input has been reduced very significantly. I also thank our auditors, Alec Harmer and Mark Middleton who have once again performed their task promptly and diligently on behalf of the Society.

Last year for the first time we published an abbreviated version of the accounts in the Journal in keeping with wishes expressed in answers to the questionnaire. As there have been no objections we will do this from now on. A full set of accounts will be lodged at Dinton Pastures or may be obtained on application to the Treasurer.

TONY PICKLES

Statement of Financial Activities
for the year ended 31st December 2006

	Un-restricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.06	Total Funds 31.12.05
Incoming Resources					
Bequests and donations	25	–	–	25	–
Subscriptions	14933	–	–	14933	12088
Investment Income	5690	3990	934	10615	10304
Trading Income	1880	3765	–	5645	5456
Sundry Income	2254	–	–	2254	1980
Total Incoming Resources	24782	7755	934	33472	29828
Resources Expended					
Direct Charitable Expenditure:					
Cost of Journal & Distribution	12468	–	–	12468	13349
Cost of facility at Dinton Pastures	–	5509	–	5509	5073
Members Meetings & Services	9235	–	–	9235	8599
Library & Curation	3977	–	–	3977	1649
Grants	3200	–	800	4000	938
Depreciation	2690	2210	–	4900	5198
	31570	7719	800	40089	34806

Other Expenditure					
Management costs	3330	–	–	3330	2077
Trading costs	607	1860	–	2467	3305
	3937	1860	–	5797	5382
Total Resources Expended	35507	9579	800	45886	40188
Net Resources before transfers	(10725)	(1824)	134	(12414)	(10360)
Net Incoming /Outgoing Resources	(10725)	(1824)	134	(12414)	(10360)
Gains & Losses on Investment assets					
Realised	–	–	–	–	–
Unrealised	14495	10168	2380	27043	33384
Net movement in Funds	3770	8344	2514	14629	23024
Fund Balances brought forward at 1st January 2006	104521	293700	21205	419426	396402
Fund Balances carried forward at 31st December 2006	108291	302044	23719	434055	419426

Balance Sheet as at 31st December 2006

	2006	2006	2005	2005
Fixed Assets				
Tangible Assets		148006		152906
Investments		268260		241217
		416266		394123
Current Assets				
Stocks	13754		14776	
Debtors	9067		9664	
Cash at Bank and in hand	2535		7159	
	25356		31599	
Creditors: due within one year	7360		6296	
Net current assets		17996		35303
Net assets		434262		419426
Funds				
Endowment Funds – Hering Fund		23719		21205
Restricted Funds				
Housing Fund	223254		216815	
Special Publications Fund	78790	302044	76885	293700
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	61601		60111	
General Fund	46898	108499	44410	104521
		434262		419426

Tangible fixed assets	*Leasehold Property*	*Fixtures & Equipment*	*Total*
Cost	**£**	**£**	**£**
At 1 January 2006	154736	69399	224135
Additions	–	–	–
Disposals	–	–	–
At 31 December 2006	154736	69399	224135
Depreciation			
At 1 January 2006	28730	42499	71229
Charge for year	2210	2690	4900
On disposals	–	–	–
At 31 December 2006	30940	45189	76129

Net book values			
At 31 December 2006	123796	24210	148006
At 31 December 2005	126006	26900	152906

Investments

In accordance with accounting requirements investments are shown in the balance sheet at market value.

	2006		2005	
	M.V.	Cost	M.V.	Cost
Shell T & T	7022	1250	6384	1250
Unilever	11483	248	10632	248
M & G Charifund	101055	20238	86909	20238
Hendersons Bond	63053	58000	59376	58000
AXA Sun Life Bond	62692	56000	51681	56000
Barings Bond	22955	25000	26235	25000
	268260	160736	241217	160736

Unrealised gains arising in the year are shown in the Statement of Financial Activities.

Fund Analysis	Tangible Fixed Assets	Invest-ments	Net Current Assets	Total
Endowment Funds:				
Hering Fund	–	23719	–	23719
Restricted Funds:				
Housing Fund	123796	99458	–	223254
Special Publications	–	63753	15037	78790
Unrestricted Funds:				
Maitland Emmet				
BENHS Research Fund	–	60601	1000	61601
General Fund	24210	20729	1959	46898
	148006	268260	17996	434262

These abbreviated accounts are extracted from the Trustees' Report and accounts, a full copy of which has been lodged at Dinton Pastures and is available to members upon application to the treasurer.

TONY PICKLES

EDITOR'S REPORT

This year saw Parts 1–4 of Volume 19 of the *British Journal of Entomology & Natural History* published during April, June, October and December. The October issue was circulated to members prior to the annual exhibition to simplify postal arrangements and the December issue so that subscription reminders could be sent out before the New Year, to those that need reminding. Volume length was 8% down on the previous year but similar to the running average for the past ten years.

I am continually told that the *Journal* content has changed much over the years. During the period 1996–1997, approximately 99% of contributing authors were members of the Society; the figure for 2005–2006 is approximately 95%. This small but possibly significant change (a slightly bigger percentage if based on page length) has been achieved by raising the profile of the journal at entomological meetings around the country and as a result receiving manuscripts from non-members. Ideally I wish more UK entomologists would wish to publish in the *Journal* as it has a far wider readership than other British entomological journals in the UK apart from *Antenna*. Ten year's ago, 56 authors had their papers published over a 2 year period, whereas today's figure is 57. Thus the number of contributing authors has not changed at all, and many of the familiar names from ten years ago are still regular

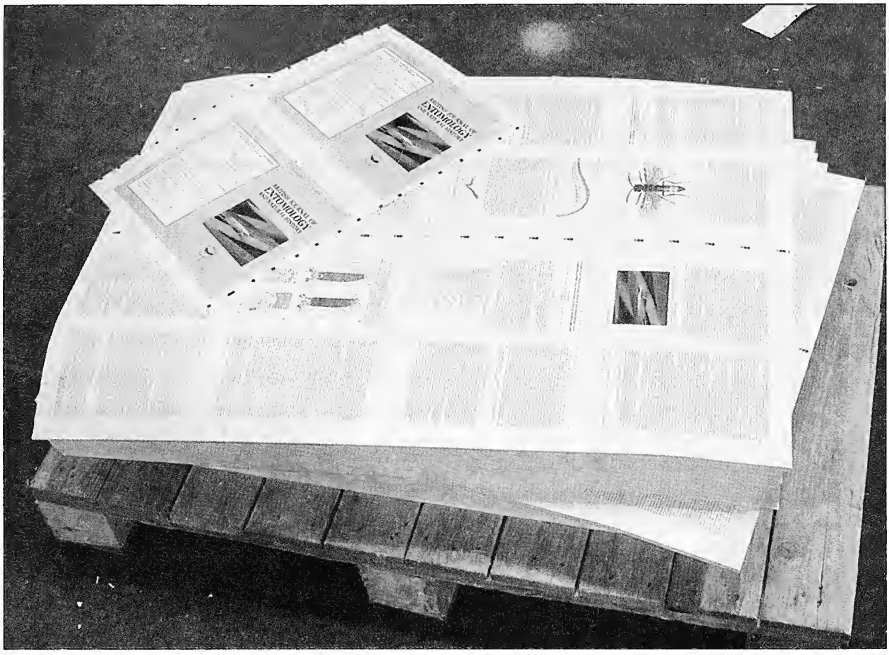

Fig. 1 Volume 19 Part 3, hot off the press, Henry Ling Ltd., October 22, 2006.

contributors today. They represent a mere 6% of our membership. Just think, if we could double our authorship base to 12% we would have an even better and more interesting journal to read. Publication times vary from one day to 10 months with more complex papers, but always less than a year, much faster than fully-professional science journals. So I look forward to receiving a lot more manuscripts and short notes in the year ahead.

No report would be complete without my thanks: to proof reader Adrian Knowles and the Indexers Roger Hawkins and David Young. Richard Jones kindly provided the plates for the 2005 exhibition (published in 2006). Jeff Higgott very bravely stepped in to take the photographs at this year's annual exhibition and I look forward to seeing the plates in due course. Examples of his close-up work can be seen adorning the front covers of the last two issues of the journal. Special thanks are also due to the compilers of the exhibition reports.

In October 2006 whilst on holiday in Dorset with my wife, I arranged a visit to our printers, Henry Ling Ltd. and to meet my contact Frank Hemmings for the first time. He very kindly showed us around the new printing facilities and we were able to see the Journal coming off the printing press and ready for cutting. The accompanying figure shows the 16 page sheet layout (with another 16 pages printed on the reverse) containing articles by Guy Knight, Joe Ostojá-Starzewski and Andrew Halstead on the sawfly *Emphytus lactincintus* (Serville) and eriophyoid mite *Trisetacus chamaecypari* Smith, both new to the British Isles. The clever bit is how the pages subsequently fall into the correct order.

JOHN BADMIN

Curator's Report

At the last AGM I enlarged on the published report to comment that I was surprised to find that I had completed 20 years as Curator and, with apparent rapidity, this has now become 21. There is relatively little to report on curatorial activity for the past year so I will also mention some other issues that have come to attention.

Last year I thanked Mike Wilson for a label list of the Auchenorrhyncha (part of the former "Homoptera"), i.e. leaf hoppers, and as predicted the collection of this group has now been transferred to the remaining new cabinet acquired some years ago. Wherever practicable, specimens were placed under the currently valid name but it must be stressed that this is an old collection and many species have been added to the British list since it was formed. Future checking is therefore desirable and it is hoped the new layout will facilitate this. At present we have specimens determined as 225 of the 382 species on the new draft list.

As a result of this the new cabinets are now being fully utilised. Drawers from Hill units that have been freed by reorganisation in recent years have been progressively repapered and I thank Peter Baker for continuing with this work during 2006. About fifty such vacant drawers are now available. Some will be needed for the expansion of the Torstenius collection to incorporate the recent donation of additional material to that collection. The remainder will be used to start the reorganisation of the Microlepidoptera, which has been promised for some years.

The question of the accuracy of determinations of the Society's collections has recently been raised. They are, of course, working collections and specimens removed from the collections for study during open days and workshops need to be returned to the location from which they have been removed. This is the responsibility of the user and it cannot be excluded that mistakes take place. Overall, it is considered that misplacing of specimens in this way is not resulting in a significant number of errors. Some regular users of the collections have remarked that this could be avoided if specimens bore determination labels. In some of the collections this is generally the case but in the majority it is not, the Coleoptera and particularly the Lepidoptera usually lacking such labels. Only when collections are systematically revised by specialists should determination labels be added to specimens. In the absence of this the option of labelling specimens with whatever name they stand over has been suggested. The feasibility of this is precluded by the large number of insects involved and the lack of volunteers to carry it out.

Of course the inherent accuracy of the determination of specimens varies with the group, and is dependent on the origin of the collection, the collectors who contributed to it, the era in which the collection was formed and whether it has been subsequently revised. As with the great majority of insect collections housed in museums reliance has been placed on the skills of the original collector and subsequent checking has been patchy.

With the exception of the Microlepidoptera as mentioned already, collections of all Orders have now been arranged according to the latest available checklist but this has usually only involved placing specimens under the currently valid names. Those groups for which checking by specialists has taken place and for which a high level of accuracy can be expected are the Symphyta and aculeate Hymenoptera, most Trichoptera, Orthoptera, Diptera and, of course, the Macrolepidoptera. In the case of the latter only those species where dissection is required for confirmation might be construed as requiring further checking. The collection of Collembola slides was loaned to Steve Hopkin for checking early in 2006 but this was precluded by his subsequent tragic death.

In the case of the Microlepidoptera the recently acquired collections of Maitland Emmet and Eric Bradford can be expected to have a high level of accuracy, while this is evidently less so with the older composite collection that contains specimens from a range of sources. Material of a number of species has been revised, usually where splits have occurred, but in a very limited way. This should be borne in mind by users of the collections.

For the Coleoptera we have the recently acquired and determined material in store boxes for which complete accuracy is expected, but the bulk of the collections have only been checked in a piecemeal way, in cases similar to the micro-moths already mentioned. It is recognised that many species need to be re-examined in the light of recent additions and corrections to the Coleoptera list. However, we have the separate Joy collection on which his book, still used as the standard identification guide, was based. So this can be expected to be accurate within the knowledge of his day. Similarly the main Coleoptera collection consists predominantly of the collections of Henderson and Massee. Both were highly respected coleopterists when they were active and so their collections are also expected to have a high level of accuracy within the constraints of knowledge at the time. This will be less true of the relatively small amount of earlier material remaining from what was held by the Society before these more comprehensive collections were acquired. Checking of specimens by specialists will continue to be a priority where the opportunity arises and assistance in this respect by volunteers will always be appreciated.

Following an initiative, discussed again at the collection managers' meeting at Oxford in September, for museums to record estimates of their holdings of species and specimens for each Order or taxonomic group of invertebrates, a spreadsheet for entering these details was circulated. A record of species held in our collections has been maintained for many years by annotating checklists accordingly, so it was already known that we had a little over 9500 named species of British insects. Estimates have now been made of numbers of specimens but these are likely to be less accurate for the larger Orders.

There have again been no major acquisitions of collections during 2006 but I am grateful to several members for continuing to donate specimens to fill gaps in the collections and for other assistance provided. In order to keep track of donations and to ensure that any additions to the collection are added to the annotated checklists a record will in future be kept as donations are made.

Otherwise events at our building have continued to be well attended and there is always plenty of lively activity. Again I urge those who have not yet experienced the delights of Dinton Pastures to consider a visit. Reports that the Country Park's Loddon Room might not be available in the future for Society activities have not yet come to fruition so it continues in use as required until further notice on this subject.

Finally I would like to thank Martin Albertini for having maintained the building so effectively over the past year and for ensuring that the internal environmental conditions are acceptable both for visitors and for the library and collections.

PETER CHANDLER

LIBRARIAN'S REPORT

Much of my time this year has been spent completing the stock audit I began in 2005, and analysing the results. A report of my findings has been produced for Council and I am in the process of writing a summary for publication in our *Journal*. Unfortunately, some titles appear to have "gone missing" since 1992 when the library came out of store with Pickfords and was installed in the Pelham-Clinton

Building. I wish like to take this opportunity to declare an amnesty for the return of any books (or journals) that members may have had on "extended loan".

The library shelves were re-organised and re-labelled as part of the audit procedure, making their appearance much neater and subject location easier.

This year I have had six boxes of journals bound, covering the following titles:

Annalen des Naturhistorischen Museums in Wien A & B, *Alexanor*, *Acta Entomologica Slovenica*, *Annali del Museo Civico di Storia Naturale Genova*, *Antenna*, *Atropos*, *Bedfordshire Naturalist*, *Beitrage zur Entomologie*, *Cecidology*, *Canadian Entomologist*, *Entomologist's Gazette*, *Entomologische Abhandlungen*, *Bulletin of the Entomological Society of Canada*, *Essex Naturalist*, *Mycologist*, *Entomologica Scandinavica*, *Bulletin de l'Institut royal des Sciences naturelles de Belgique*, *Entomologica Fennica*, *Entomologica*, *Entomofauna*, *Graellsia*, *Fragmenta Entomologica*, *AES Bulletin*, *Doriana*, *Entomological News*.

During July I received several papers and short communications on Phoridae (Diptera) from R.H.L. Disney. These acknowledge the grant he received from the Professor Hering Memorial Research Fund and are in the Separates Section of the Library, should members wish to consult them.

I wish to close this years' report by thanking the following for their assistance and support: Dr John Muggleton for his assistance in logging new journal receipts, Martin Albertini and Gavin Boyd for selling duplicate journals and back numbers of our *Journal* and finally Bernard Verdcourt, David Young and Jim O'Connor for donating books and/or journals to the library.

IAN SIMS

MAITLAND EMMET BENHS RESEARCH FUND

One grant application was received this year and this was considered by the panel to be worthy of funding. A grant of £500 has, therefore, been awarded to Dr Zoë Ringwood to assist with her project on the ecological requirements and conservation of the plume moth *Emmelina argoteles* (Meyrick). This moth was first recorded in Britain in 2005 and, on the basis of external characters, is indistinguishable from *E. monodactyla* (L.). The project should establish the habitat requirements and distribution of this newly recognised addition to our fauna.

The low number of applications for grants in recent years has meant that, when the Society was approached this year by Butterfly Conservation for a grant to assist the funding of the National Moth Recording Scheme (NMRS), we were in a position to offer a grant of £2000 from the Research Fund to demonstrate the entomological community's commitment to the scheme. This grant was gratefully accepted by Butterfly Conservation. We expect to donate a further £1000 towards the NMRS through Research Fund grants to assist with fieldwork related to the scheme.

Mr Robin Williams has kindly donated a copy of his two volume work, *Oak-galls in Britain*, to the Society's Library. Mr Williams received a grant from the Research Fund in 1999 which contributed towards the research for this work. He had already presented us with copies of a draft of the work. We thank him for his donation which will shortly be available in the Society's Library.

The Society's thanks are due to the members of the Research Fund panel for their deliberations and to an anonymous referee for his comments on this year's application.

Applications for future awards from this fund in the fields of non-marine arthropod taxonomy, field biology and conservation related to the fauna of the British Isles should be sent to the Society's Honorary Secretary (from whom further details can be obtained) before 30th September in any year.

JOHN MUGGLETON

Professor Hering Memorial Research Fund

The Committee considered two applications to the Fund for 2006. They were both supported.

Professor Jonas R. Stonis (formerly Puplesis), of Lithuania, sought and was granted £300 towards expedition expenses to the Andes and the Amazon Basin, 'mainly focussing on the biology and species inventory of the poorly-studied Nepticuloidea (Lepidoptera) and related insects'. Professor Stonis enumerates an enviable track record of research in the application for funding and the Committee felt this grant would be well used. Although I, as the new Secretary of the Fund, have not so far seen details, it appears that Professof Stonis has received previous grants from the Fund, the last in 2002. Also, not seen, a number of publications have been presented to the Fund including a Monograph, Puplesis, R., Diskus, A. 2003 *The Nepticuloidea & Tischeroidea (Lepidoptera) – a global review, with strategic regional revisions* Lutute Publishers, Kaunas, 552pp. Puplesis *et al.* have named a species of nepticuloid (*Acalyptris martinheringi*, Lepidoptera, Nepticuloidea), from Belize, in honour of Professor Martin Hering.

The second application was probably ground breaking for the Fund and most interesting. Ms. Claire McDonald, a PhD student in the Earth Sciences at Leeds University sought travelling funds to enable her to study Antarctic fossil leaf collections held in the USA. She argues that, as a zoologist, it should be possible to develop links between fossil remains and contemporary leafmines from a zoological, rather than the usual palaeontological, point of view. The Committee felt that, although the objectives were rather demanding, it is a little studied field and should be encouraged. A grant of £600 was offered provided suitable funds could be obtained elsewhere to make up the £1094 asked for. This was accepted.

I am very grateful to the other members of the Hering Committee for easing me into my new task so nicely and for the work they have done in assessing applications to the Fund.

Applications for future awards from the fund should be made to Mr David Henshaw, whose address is on the Society's website, before 30th September 2007.

David Henshaw

Bees, Wasps and Ants Recording Society (BWARS) Report

BWARS is primarily a recording society and publishes *Provisional Atlases* of the British aculeate Hymenoptera. It also produces a bi-annual *Newsletter* that in recent years has developed into something more closely resembling an entomological journal.

The highlight of the society's year is the AGM and workshop. In 2006 we were invited to Cambridge. Attendance was high, with at least twenty people meeting for the dinner on Saturday night. The workshop session provided an opportunity for both beginner and expert to identify and confirm specimens caught during the year, and concluded with a guided tour of the entomology section of the University museum led by Dr W. Foster.

On the Sunday, members' talks covered a range of topics. Jeremy Field described the nest-provisioning strategies of the wasps *Ammophila pubescens* Curtis and *A. sabulosa* (L.). Steven Falk talked about his explorations on the South Downs of East Sussex – an area with very little modern recording data. Several guests joined us from Europe. Paul Westrich described the production and implementation of site management plans in Germany, and Koos Beismeijer talked about his involvement in the Alarm project which showed that bee diversity had declined in both Britain and Holland in the last 25 years. The session concluded with members' "slides".

The society's web-site (www.bwars.com) has been extensively overhauled by Nigel Jones and, although still under development, is rapidly becoming a professional, and attractive, site for people to learn about BWARS and aculeate Hymenoptera in general.

In 2005 a major change in the newsletter occurred with its transition into a journal. In 2006 further improvements included the use of a full-colour cover, allowing the photographic talents of a number of members to be shown to a wider audience.

GRAHAM A. COLLINS

DIPTERISTS FORUM REPORT

As usual the year started with a well attended workshop held at the Preston Montford Field Centre, this year on the identification of the Empidodidea (Dolichopodidae and Empididae).

Following the success of the event the previous year another Spring Field Weekend was held, this time in the Hereford area. In addition to the opportunity to visit some very interesting sites this, like the Autumn Field Meetings, was also an enjoyable social occasion.

The summer Field Week was based at Plumpton College, near Lewes, East Sussex. Here we had access to many excellent calcareous sites and we were mostly fortunate with the weather. Significant finds included what may be the first British record for the empid *Hilara tenella* Fallén and a fifth site for the tipulid *Dicranoptycha fuscescens* (Schummel). The meeting coincided with the flight season of the tabanid *Atylotus rusticus* (L.), which was found at several places on the Pevensey Levels, adding to our knowledge of its habitat requirements.

The Autumn Field Meeting took place in Radnorshire, based at Llandrindod Wells. Perhaps as a result of previous dry summers the numbers of autumn craneflies and fungus gnats seemed lower than would have been expected.

This year our AGM was held at the Oxford University Museum of Natural History over a weekend. On the Friday afternoon there was an opportunity to visit the historic Hope Entomological Library. This is the third most important entomological library in the UK and has many old works, about 60,000 catalogued offprints and subscribes to many current entomological journals. The archives contain letters and manuscripts from earlier Oxford entomologists, such as Hope and Westwood and the diaries of J.W. Yerbury. The Saturday meeting included talks that covered a range of subjects. These included the history and details of Oxford University Museum's Hope Entomological Collections, plant galls and Diptera, progress in the production of a new Handbook on sciarids and an introduction to the subject of leaf mines. The Dipterists Forum AGM followed the talks. In the evening there was a Dipterists Supper at a Chinese Restaurant and on the following day access to the Hope Entomological Collections was arranged.

Membership stands at 289 including 32 libraries and overseas members and there are 277 subscribers to our peer-reviewed journal *Dipterists Digest*. The Membership Secretary again took our publicity material to the AES Exhibition at Kempton Park and our recently appointed Publicity Officer has designed an attractive publicity leaflet in colour, which was available at the BENHS Annual Exhibition.

After an enormous amount of work by our BAP Species Officer, a list of Diptera was sent via Buglife to JNCC for consideration and 18 additional species have been added. The additional species are being grouped so that those with similar requirements can be worked on together as additional funding is not being provided.

KEN MERRIFIELD

PRESIDENTIAL ADDRESS
Part 1

NORMAN M. HALL

When Mike Wilson asked me in 2004 if I would be President of the Society, I considered it a great honour and soon accepted, but the thought of having to deliver a Presidential address one day was somewhat daunting. It is the President's curse, and today that 'curse', like a chicken, has come home to roost. However, I have enjoyed my presidency so far.

As other recent Presidents have commented, I have found that my role was really to act as a figure-head to represent the Society, but in this role there have been few duties. I have not, like my predecessor, been invited to lavish launches of BBC television series, and have not been invited to talk to the media at all. Also, as we shall see later, the membership has been remarkably fit, perhaps realising that an excellent hot summer is not the time to shuffle off the mortal coil. Though the Council report referred to five deaths in 2006, some of these occurred in the unusually cold January and February before I became President, and were announced at the last AGM.

Like previous Presidents, I have found that I could make little impact on the Society in one year. The main advantage of being President seemed to be that my own ideas were perhaps a little more likely to be taken seriously by Council, and that I could occasionally say 'it's obviously worth trying, let's just do it'. However, as it is the Council as a whole that makes decisions – and as a President does not just 'vanish' at the end of his term – I will not join any call for two-year presidencies yet. In any case, the prospect of two Presidential addresses would be even more daunting.

Now a President in Part 1 of his address can traditionally comment on his views of the role played by the Society, and its future, and this is what I propose to do.

The objects of our Society are enshrined in the by-laws, which refer to the promotion and advancement of research in biology, especially entomology – N.B. not just entomology. The Society's name includes the phrase '& Natural History', and this, as well as the by-laws, 'allows in' studies of creatures such as arachnids on an equal footing to insects, and reflects the fact that a general knowledge of Natural History is necessary whatever creatures we are studying. Perhaps I should have said 'allow in arachnids on an unequal footing to insects'; eight instead of six. However, there is no doubt that insects are our main concern.

Although we have a high proportion of lepidopterists, of which I am one, the Society is large enough to include numbers of experts in almost all the other insect Orders, and people wishing to study these can benefit particularly by joining. We surely have a special responsibility for promoting the study of these 'less popular' insect Orders.

Many professionals working in museums, and particularly the Natural History Museum, are members, and the links to the museums, plus the fact that we have our own extensive collections and library, sets our Society apart from other UK entomological societies open to amateurs. In other European countries, such as Spain and France, there are far fewer amateurs doing scientific work. Anybody 'serious' is assumed to be from a museum or university or working for a conservation body. This gives rise to problems when trying to obtain permission to work on the continent, as we will see later.

Apart from 'The Professionals' the Society also has many members who could be described as 'Expert Breeders'. Some of these are pushing the boundaries of knowledge, unravelling unknown life-histories; others just want to build collections

of perfect specimens for their own pleasure, and are happy to do this by collecting early stages at known localities. The latter may not add anything to scientific knowledge, but are nonetheless part of the body of 'Expert Breeders' which, as a group, holds a great fund of knowledge about species and their habit requirements – knowledge, essential to conservation, which is passed down the generations as one member tells another how and perhaps where to obtain the species. This fund of knowledge is one of the greatest assets of the Society, and one of the Society's roles is to make sure that it is passed on and not forgotten. Note that I have no complaint about members who have no burning desire to add to this fund of knowledge. In my opinion all ways of studying or enjoying insects should be encouraged and respected, including what we might call 'moth-watching' where, as in bird-watching, no specimen is ever collected. I try to encourage moth-watchers to take the occasional specimen, and point out to them that the breeding biology of insects is based on high fecundity, so that taking the occasional specimen can do no harm to the species but if they still feel that it is wrong *for them* to take any specimen I will respect that.

In order that the Society can fulfil its role in the future, it is essential to keep membership numbers up, and the Society should always be asking itself the question 'Why should anyone choose to join?' When I joined the Society in 1979 the answer used to be that it was difficult to learn about such topics as identification of microlepidoptera or dissection, or to learn essential field skills, *without* joining the Society. All the nation's experts were members already. You could ask them for identifications at the Annual Exhibition and they usually obliged. You could go on post-exhibition field excursions with the likes of Colonel Emmet or Eric Bradford to learn about leaf mines and coleophorid cases. The staff of the Natural History Museum ran annual microlepidoptera workshops in their own time to encourage amateurs to try to do professional standard dissections or to identify specimens structurally and not just by wing pattern matching. Klaus Sattler was very instrumental in organising these meetings, knowing that if the Museum helped the amateurs, the amateurs would help the Museum. I have always felt greatly indebted to him for his efforts. If my memory serves me right, these workshops ended only because of the efforts of Mrs Thatcher to make everything 'commercial'.

Since then there have been many changes. The biggest has been the rise of the Internet. There are now websites for dissection, leaf mines, and the less popular insect Orders. There are Yahoo groups and websites for micromoths and macromoths, and sites on which images of moths can be posted for instant identification. Sometimes they even seem to get the right answer – but when there is no corresponding specimen available there is no way to confirm it, which detracts from the value of the original image for future identifications. Some of our members are totally dismissive of the whole process. "You can't dissect an image". "It's the blind leading the blind". For myself, I see value in it. Perhaps many of us are not looking properly at our insects while they are alive, and many of them are. They are increasing the fund of knowledge re the skills of field identification, and will get better at it. This will ultimately affect which specimens we need to take for identification. The main problem, from my point of view, is that they tend to assume that one image of a specimen is sufficient for identification – but you cannot see on one image everything you can see in the field, and an insect may not be identifiable to species level even if you could. I would like to see more of our members contributing to image-based web chat and making constructive criticisms.

Apart from 'The Web', local moth groups have sprung up everywhere, some specimen based, some not. There are new and excellent magazines such as *Atropos*. In a nut-shell, there is much more competition, so the Society must beware.

The Society is much needed. People still exchange information and learn much better by direct contact either in the field, through contact with experts acting as 'mentors' or at indoor meetings where they can discuss their problems, where, as at our annual exhibition, there may be no formal speaker at all, and where many bring specimens for show or discussion. In my opinion, the Society must try to organise or support more meetings of this kind *countrywide* – more devolution is needed. In areas where our members are thin on the ground we might have to do this in co-operation with local groups. I wonder how many local groups would welcome BENHS members at their field meetings and would like their meetings advertised in our programme?

First steps towards devolution of activities came this year following offers from Mike Wilson of the National Museum of Wales and Darren Mann from the Hope Museum in Oxford, both members of Council, to organise free one day meetings at their Museums, with several speakers and tours of the collections. They were to be regional meetings of the BENHS, but open to all. They were both highly successful. In Cardiff there were about 50 participants, with BENHS members rather outnumbered, reflecting its distance from the South East. In Oxford, there were about 60 participants with BENHS members in a strong majority. Because of this success these regional meetings will continue and will hopefully be expanded. Certainly both Mike and Darren are prepared to continue holding such meetings in future, perhaps annually, and we are expecting Guy Knight of Liverpool Museum to organise a meeting next year.

I want to thank to Mike Wilson and Darren Mann not only for organising their meetings so well, but also for all their other work on Council.

I also wish to thank all the other elected members of Council who have served during my presidency.

John Muggleton, our Secretary, personifies the continuity of the Society and does a great deal of work on its behalf, being especially good at writing 'appropriate' letters in controversial circumstances. He minutes the Council meetings himself making the President's task much easier. He also helps the President out when he forgets things, which in my case is not infrequent.

Of the remaining members, I want to single out David Young who, in addition to his work on Council is now both Distribution Secretary and Membership Secretary. Holding both posts makes it possible for him to ensure that applicants for membership now receive Society literature straight away. He has lately produced a flyer for the Society which will help with future recruitment. He also acts as a co-ordinator for the Society's website, which is efficiently maintained by his wife, Pauline, who also deserves our thanks. And on top of this he helps to produce the Index for our Journal, a rather thankless and time-consuming task, as I know, having done it myself for several years. In short, he does far more than his fair share of the work needed to keep the Society going.

Special thanks are also due to Martin Albertini for looking after the Pelham Clinton building, to Ian Sims and Peter Chandler for their work on the library and collections there, to John Badmin for his work editing the journal, to John Phillips for dealing with conservation matters and representing us at Invertebrate Link and to Ian McLean for his work as lanternist, without which my address would have no Part 2.

Final thanks go to Andrew Halstead, who has minuted the indoor meeting for many years, including all of those at the Royal Entomological Society, so well, and has contributed so many interesting exhibits. This is the end of an era for him as for us all, as there will be no more indoor meetings here.

Finally, as I come to the end of my address, it is my sad duty to record the passing of just two members, mercifully few, compared with recent years.

Ron Crouthers (R.W. Crouthers) lived in Dorking and died September 2005 in his late seventies. He was interested in butterflies and the larger moths such as hawk-moths, and was especially interested in the blues and the hairstreaks. He collected not only in the UK but also in France and Malta. Following a car accident in France in 1976, he found that he had lost his confidence driving abroad, and never went again, but his interest in butterflies remained strong and he joined our Society after the accident, in 1977. He also attended AES exhibitions regularly, dealing in livestock. His wife, however, soon developed motor neurone disease and as time went on he spent more and more of his time nursing her at home. Entomology became an activity for the occasional Tuesday afternoon. He then became ill himself and he and his wife sadly died within six weeks of each other. A close entomologist friend described him as 'a lovely man to know'.

Margaret Brooks (Miss Margaret Mary Brooks) lived all her life in Wimborne, Dorset and died on 16th October 2006, aged 70. She was a keen lepidopterist, but was interested in all Natural Sciences. Though she always lived in Wimborne, she travelled abroad, making several visits to the Canary Islands, South Africa and Australia. Her training was in pharmacy, but she and her father, an engineer and himself a keen lepidopterist, both retired at about the time she joined our Society in 1974. He was ill at the time and she retired to look after him, her mother having died at her birth. Greatly encouraged and helped by her father, she set to work photographing all the British butterflies in all stages, for '*A Complete Guide to British Butterflies*', 1982. Later she photographed all four stages of a selection of moth species covering all families for '*A Complete Guide to British Moths*', 1991, a book looking rather like Skinner's Identification Guide, and with a similar set of identification plates of set specimens at the end. Her collections and her library of 20–30,000 photographic slides are now with the Bournemouth Natural Science Society.

A close friend described her as a happy person and a pleasure to visit. She told him that if she lived her life all over again, she would make no changes. She will be sadly missed.

BENHS INDOOR MEETINGS

9 May 2006

The President Mr N. HALL chaired the meeting.

Mr A. J. HALSTEAD showed a live specimen of the very local soldier fly, *Odontomyia ornata* (Mg.). This had been reared from a larva supplied by Martin Drake. Also shown was a live parasitic wasp, *Rhyssa persuasoria* (L.), found on a conifer log at the Royal Horticultural Society's Garden, Wisley, Surrey.

Mr R. PARKER displayed some fact sheets produced by Butterfly Conservation on 39 Biodiversity Action Plan (BAP) butterfly and moth species.

The following persons were approved by Council as members: Mr Peter R. May, Mr Michael Ferns, Mr Phillip J. Black, Mr Lee Manning and Mr David Cooper.

Dr M. MAJERUS spoke on 'The Harlequin Ladybird – friend or foe?' The harlequin ladybird, *Harmonia axyridis* Pallas was first found in Britain as a breeding

species when Ian Wright found an adult at Sible Heddington, Essex on 19 September 2004. The speaker prepared a press release on 30 September, which was issued by the University of Cambridge on 5 October. The press release described the arrival of the harlequin ladybird as a potential ecological disaster, partly to grab the attention of the media. It worked because the press release was taken up by a wide range of newspapers, magazines, radio and television channels.

This ladybird originates from Japan but has been deliberately introduced into the USA as a biological control agent of aphids. An initial introduction in 1916 failed to establish, as did subsequent attempts, but in 1988 it finally became established in Louisiana. It has spread and is now the most common ladybird in North America. It was introduced as a biological control in glasshouses in the Netherlands and Belgium in 2000 but soon escaped and became established out of doors.

The harlequin ladybird is a voracious predator that feeds primarily on aphids but will also eat scale insects and a wide range of non pest species. It can out-compete native aphid predators by reproducing more rapidly and by taking a greater share of the available prey. Both adults and larvae of the harlequin ladybird will eat the eggs, larvae and pupae of native ladybirds, hoverflies and other insects. There are various routes by which the harlequin ladybird may have come to Britain. There is evidence to suggest that some came on cut flowers from the Netherlands and Belgium that were being sold by Tesco. Also there was evidence of the beetle arriving on packing cases from Canada. The beetle may also have flown across the Channel or could have come in on cars or lorries travelling from the Continent.

Funding was obtained in record time to enable the spread of the harlequin ladybird in Britain to be monitored and to record its impact on the native fauna. Many of the early sightings received from the public were of various native ladybirds but by the end of 2004 there were about 100 verified records of the harlequin ladybird.

On 15 March 2005 a web site was launched to encourage the recording of both the harlequin and native species of ladybirds [www.harlequin-survey.org]. In 2004 the harlequin ladybird was mainly confined to East Anglia and south east England. Since then it has spread more widely and increased in abundance. Most sightings are made in October and November.

In Britain the harlequin ladybird appears to have three generations, compared to one generation for most native species. In America it can be a nuisance in the autumn when thousands of ladybirds may enter a building in search of hibernating sites. They can stain fabrics, may bite people and can cause allergic reactions.

Research is being conducted to measure the extent to which harlequin adults and larvae are likely to feed on native aphid predators. The eggs of the 14-spot ladybird, *Propylea* 14-*punctata* (L.) are not eaten but this appears to be the exception. In contests between larvae of the harlequin ladybird and other species, the harlequin invariably wins. The speaker predicted that the 2-spot, 7-spot, 10-spot and cream-spot ladybirds could be in trouble in places where the harlequin ladybird is abundant. Ladybirds associated with conifers, and those that feed on plants or mildews are less threatened.

12 September 2006

The Vice President, Mr R. PARKER, welcomed members of the London Natural History Society to the joint meeting.

Mr M.J. BLECKWEN showed a dead bee, later identified as a female *Osmia rufa* (L.) that had been found in a house near Heathrow.

Mr R.D. HAWKINS showed live larvae of two soldier flies, *Odontomyia tigrina* (Fabr.) and *Oplodontha viridula* (Fabr.) found by pond-dipping at Bay Pond nature reserve, Godstone, Surrey on 10.ix.06.

Dr J. MUGGLETON exhibited four migrant moths taken at MV light in his garden at Wilton, Wilts. Specimens of the Scarce Bordered Straw, *Helicoverpa armigera* Hübn. had been seen on 12 nights in the last three weeks. Specimens caught on 17 and 21 August were shown to illustrate the range of colour forms in this species. On 11 September, specimens of the Vestal, *Rhodometra sacraria* (L.), and the Four-spotted Footman, *Lithosia quadra* (L.), were taken. The latter may have been a vagrant from a colony in a neighbouring county but two other migrants, White Point Wainscot, *Mythimna albipuncta* (D.&S.) and Rush Veneer, *Nomophila noctuella* (D.&S.) had been taken on the same night. Dr Muggleton also showed a local beetle, *Oncomera femorata* (Fabr.) (Oedemeridae) that had been taken in his garden at MV light on 27.vii.06.

Mr R. UFFEN showed some horse chestnut leaves mined by the gracillariid moth, *Cameraria ohridella* Deschka & Dimic, together with some live adult moths, collected in Battersea Park, London.

Mr R. PARKER showed some photographs of Camberwell Beauty butterflies, *Nymphalis antiopa* (L.), and distribution maps for sightings in Suffolk. There had been an influx of this migrant species since 3 August. A low pressure system caused northerly or north-easterly winds from 3–19 August, allowing the butterfly to spread eastwards from Poland or south Scandinavia. There had been 31 sightings in Suffolk, 41 in Norfolk, with other records in Essex, Cambridgeshire, Hertfordshire and Northamptonshire. 2006 has been the best year for this butterfly since 1995.

Mr R. HAWKINS noted that the Harlequin ladybird, *Harmonia axyridis* Pallas, was spreading in east Surrey. He also said that the finding of Wood Cricket *Nemobius sylvestris* (Bosc) at Bookham Common, Surrey, reported by a member of last year's Joint Meeting, was an error. The correct location was Wisley Common, Surrey, where this insect has been established for many years.

The following persons were approved as members by Council: Mr David Gardner, Ms Leanne Wall, Mr Stephen Sowden, Ms Liz Egebäck Foxbrook and Mr N. Hopkins.

TONY DAVIS then gave the Brad Ashby Memorial Lecture entitled 'Action for Britain's threatened moths and butterflies'. He outlined some of the work that Butterfly Conservation is engaged in. This charity has recently obtained National Lottery funding for four years to set up a national macromoth recording scheme. Matching funds are now being sought. The scheme will aim to encourage a greater appreciation of moths and their conservation. It will produce a modern database of moth distributions and will be used to support conservation projects. There will be on-line recording and feedback for recorders. Training sessions will be held to improve expertise in identifications. Provisional distribution maps will be produced, followed by a final atlas.

An analysis of data accumulated by the long-running Rothamsted moth survey was funded by money obtained by Butterfly Conservation. This showed that some common moths have suffered significant declines in abundance and distribution. This study was published in the 2006 booklet '*The state of Britain's larger moths*', which received wide media coverage.

The 'Action for threatened moths' project is funded largely by Butterfly Conservation and English Nature. When it started in 1999 it concentrated on UK BAP priority species. Initially this covered distribution, surveys, monitoring of populations and autoecology studies. Now there is a greater emphasis on habitat protection and management.

Some BAP priority species are now known to be at less risk than previously thought. The Buttoned Snout, *Hypena rostralis* (L.) is not attracted to light and appeared to have declined. However, searches for the larvae on wild hop show that this species has maintained its distribution. The Toadflax Brocade, *Calophasia lunula* (Hufn.) was confined to coastal areas in Sussex, Kent and south Essex but has recently spread into Suffolk, east London and further west in Sussex. The Striped Lychnis, *Shargacucullia lychnitis* Rambur, has also expanded its range and is mainly found on *Verbascum* on roadside margins. It is intended to keep this moth as a BAP species as a means of improving roadside verge management.

The Brighton Wainscot, *Oria musculosa* (Hubn.) has declined on Salisbury Plain and has not been found since 2002. It has also declined elsewhere in Europe and may be suffering from changes in farming practices. The Pale Shining Brown, *Polia bombycina* (Hufn.) was widespread in south east England but has declined to a couple of places on Salisbury Plain, although a colony has recently been found in north east Oxfordshire. The larval food plant is unknown. The caterpillars will eat hawthorn leaves in captivity but growth is poor. The Speckled Footman, *Coscinia cribraria* (L.), is a part migrant, part resident species that is found on dry heathland in Dorset. Its food plant there is uncertain. A few larvae have been found on bristle bent, *Agrostis curtisii* Kerguélen. Studies of the Dark Bordered Beauty, *Epione vespertaria* (L.) have shown that the larvae feed on short aspen plants in the Scottish Highlands but on dwarf willow in Yorkshire.

In the Lake District, the Netted Carpet, *Eustroma reticulata* (D.&S.) feeds as larvae on touch-me-not balsam, an annual that needs disturbed ground. There are plans for a joint project with the National Trust to reintroduce this moth at Derwent Water where cattle will be used to poach the ground.

The Fiery Clearwing, *Pyropteron chrysidiformis* (Esper) is found at Folkestone Warren and on the north Kent coast. The Kent sites may have little future because of coastal erosion. At Folkestone Warren there is a problem with invasive buddleia plants. The Straw Belle, *Aspitates gilvaria* (D.&S.), occurs on a few sites on the North Downs in Surrey and Kent. This is a species that does not benefit from sheep grazing, which is sometimes used to control scrub growth. The Drab Looper, *Minoa murinata* (Scop.), is mainly found in woods in Hampshire, Dorset and the Forest of Dean. Its larval food plant, wood spurge, needs coppice management and this is being encouraged on endangered sites.

He commented that there are various ways in which people can get involved with moth conservation. They can record moth species and numbers and submit the records to county recorders and Butterfly Conservation. Some moths are day-flying and can be recorded by people who do not have light traps. People can undertake regular monitoring of BAP priority species in their area and search for new sites.

He concluded by saying that the list of species on the BAP priority list will be regularly reviewed. Some are likely to be removed but others, such as Goat moth and Scarce Vapourer, may be added. For the first time Butterfly Conservation is looking at micromoths as candidate BAP species but there is a lack of data on their distributional status and rates of decline.

Recording and Conserving the Invertebrates of Wales, National Museum of Wales, Cardiff 28 October 2006

This was the first of the BENHS Indoor meetings to be held as a regional meeting, and was hosted by the National Museum of Wales, Cardiff. It was decided to attempt a programme of local interest, although like the second meeting in Oxford it was to be based around some talks and a visit to the collections. This combination seems to be generally attractive and was attended by around 50 people, of which around 15 were BENHS members. A number asked if this would become an annual event.

Introduction to the insect collections in the National Museum and what they are used for: by Dr Mike Wilson, Head of the Entomology Section, Department of Biodiversity and Systematic Biology, National Museum of Wales. Mike introduced the day and gave a short overview of the entomological collections, their history and their use.

The moths of Glamorgan: progress and the future: by David Slade, South East Wales Biological Records Centre (SewBrec).

David Slade gave an overview of the very successful project, which is based on recording moths in Glamorgan (VC41). In a relatively short time a great deal of information on the distribution of macro and also now micromoths has been gathered. Targetted trapping been carried out in those areas with few records. A book on the moths of Glamorgan is in final stages of preparation.

From recording to conservation action: case studies from Lepidoptera in Wales: Russell Hobson. Butterfly Conservation (Wales).

Russell outlined the work of Butterfly Conservation in Wales and gave details of some of the special projects being carried out on the conservation of certain species.

After lunch we had scheduled time for a discussion on aspects of future recording and conserving the invertebrates of Wales. In the event this was a wide-ranging exchange of views on topics such as how do we encourage more people to become field-based entomologists, on the trend to non-collecting of certain specimens (with the consequences to records) and on records centres in Wales and elsewhere.

The highlight for many was clearly a tour of the insect collections. It is surprising that many feel that they cannot easily gain access to the collections for their studies. I hope that such meetings can dispel such attitudes and encourage active collaboration between museum and field-based entomologists.

Oxford University Museum of Natural History 20 January 2007

This was the second of the BENHS regional meetings and was hosted by Darren Mann of the Oxford University Museum of Natural History. The day was centred on the entomological activities of four institutions holding some of the foremost insect collections. The day was attended by over 60 entomologists, of whom the vast majority were BENHS members, and was thought by all to have been an enjoyable event. One of the previous common misconceptions of the amateur community that is of Museum collections being the sole preserve of academics and professionals was thoroughly repudiated by all those who spoke.

History of the Hope: by Dr George McGavin, Assistant Curator, Hope Entomological Collections.

George gave a talk on the 148-year history and the future of the Hope Entomological Collections, the second largest insect collection in Britain. Highlights of the talk included images of Dr Livingstone's tsetse fly and the oldest pinned insect in the World – Dale's Bath white.

Beetles at the Natural History Museum: Max Barclay, Curator of Coleoptera, Department of Entomology, The Natural History Museum, London.

An introduction to the collections of the Natural History Museum, London one of the largest collections of beetles in the world. Max gave an account of the history of the collection and some of the associated famous figures and went on to introduce current aspects of the collections and their management and development.

From collection to the web: Mike Wilson, National Museum of Wales.

Digital imaging is transforming the use of museum collections. An example from a project to image the world 'sharpshooter' leafhoppers was discussed. This talk showed both the value of collections and their digitisation, especially in making these valuable resources available to all. Mike, did however, point out that images are no substitute for specimens.

World Museum Liverpool: Guy Knight, Zoology Curator, World Museum Liverpool.

Guy spoke of the history of the collections from their early start to the damage caused during WWII, and the remit of the museum to both house and display their collections. The recent refurbishment of the entomology department had at its core access to collections by both the general public and amateur entomologists.

View from the Outside: Mark Telfer.

The 'amateurs' view on Museum collections. Mark's talk highlighted some of the advantages and disadvantages of using a museum collection, with some valuable remarks on 'how to use a museum collection' and on the pitfalls that you can encounter. Comments made on the poor level of identification within some beetle groups in museum collections provoked some discussion later by curators.

Museum standard specimen preservation: Darren J. Mann, Collections Manager, Hope Entomological Collections.

The reputed oldest pinned insect in the World is 304 years old; this specimen has lasted for such a time through curatorial care. Museum standard practices for specimen preparation and preservation, such as type of pin, labelling card and mounting agents are critical for the longevity of insect specimens. Darren gave examples of both good and bad specimen preservation, and how non-professionals could achieve the same standards as museums.

A brief discussion followed the talks, after which members were invited on a guided tour of the Hope Entomological Collections.

SHORT COMMUNICATIONS

The naming of the Harlequin ladybird, *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae).– I was very pleased to read John Muggleton's recent, fascinating speculation on the etymology of *Harmonia axyridis* (Muggleton, 2006). This ladybird, which arrived in Britain in 2004 (Majerus *et al.*, 2006), is known in Britain by the common name, the harlequin ladybird. Elsewhere in the English speaking world, the species has a wide variety of names. In half-an-hour, a search on the web came up with 13 names (Asian ladybird beetle, Asian ladybug, Halloween ladybug, Hallowe'en ladybug, Halloween lady beetle, Japanese ladybug, Multivariate ladybug,

Multicolored/multicoloured ladybug, Multicolored Asian lady beetle, Multicolored Asian ladybug beetle, Multicolor Asian Lady Beetle, Southern beetle, Two-spot lady beetle), in addition to variations on harlequin, and I am sure this list is not exhaustive.

When the species was first recorded in Britain, I had to decide on a common name for this species for a press release. Searching through the common names available, I decided that the name harlequin ladybird was the most appropriate. I had one major positive reason for this choice, and a number of minor negative reasons. The positive reason is that the nominate form of this species (*H. axyridis* f. *axyridis*) has a chequered-patterned appearance, much like the pattern on the costume of Harlequin in the Divine Comedy, although the white and black of the costume are replaced by orange or red and black in the ladybird.

The rejection of some of the other names that had previously been used were of minor moment, but may be of some interest. The use of Japanese or Asian in the name was rejected because although *H. axyridis* originates in Asia, those that arrived in Britain came from continental Europe, and also, as we now know, from Canada (Majerus *et al.*, 2006). The use of multicoloured was rejected owing to some ambiguity in the name as it may be understood as many colours occurring on the same individuals. The name Halloween ladybug was rejected as I suspected at the time (September 2004) that these ladybirds would not be active in late October in Britain. My reason for believing this was that by early October, most native species of ladybird in Britain have retired to their overwintering sites. (On the basis of observations in 2004 and 2005, my view that *H. axyridis* would not still be active at the end of October is erroneous). The name Two-spot lady beetle was rejected because we already have a two-spot, while the name Southern beetle simply seemed inappropriate.

I was thus left with either the multivariate ladybird or the harlequin ladybird. I opted for the latter because of the colour pattern of the nominate form and because the name seemed more appealing and memorable: important considerations in the context of my intention to engage the press and public in a survey of this invasive alien species.

While I had the pleasure, in 1985, of giving common names to most of the British coccinellids that have the appearance of ladybirds, I cannot claim to have re-christened *H. axyridis*. The name harlequin has previously been used for this beetle in North America. I first read it in a newspaper article on how *H. axyridis* invades homes in the United States in 1995.

For information, records of the harlequin ladybird increased more than ten-fold in the period October–December 2005, when compared to the same period in 2004. Moreover, the distribution has expanded considerably over this period, with the species moving about 80 km to the west and north from its December 2004 distribution. As Dr Muggleton says, it will be interesting to see the further progress of the harlequin. – MICHAEL E. N. MAJERUS, Department of Genetics, Downing Street, Cambridge, CB2 3EH, e-mail: m.majerus@gen.cam.ac.uk

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Muggleton, J. 2006. *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae), the multi-coloured Asian ladybird, an etymological note. *British Journal of Entomology and Natural History*, **19**: 5.

***Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae) a further etymological note.** – My colleague Peter Edwards pointed out to me a number of harlequin ladybirds entering slightly open windows in a stair-well of the herbarium at the Royal Botanic Gardens Kew on 6 November 2006 and also mentioned that the species had been at Kew for over a year. Needing the correct scientific name for adding it to the 36th Supplement of the 'Wild Fauna and Flora of Kew', now in the course of preparation, I was puzzled by the specific epithet. Finding from *Index Animalium* that it had been described by Peter Simon Pallas (1741–1811) (the famous German naturalist and traveller who spent most of his life in Russia) in his *'Reise durch verschiedene Provinzen des russischen Reichs'* 1771–1776, a copy of which is in the library at Kew, I looked up the original description. This states that he found it on the plant *Axyris amaranthoides* L. (Chenopodiaceae) so the epithet is easily explained. The plant genus was so-named by Linnaeus because its leaves have a scurfy stellate indumentum, the Greek adjective axyros meaning unshaven.

John Muggleton (*British Journal of Entomology and Natural History* **19**: 5 (2006) has commented on the common name harlequin so it seemed useful to add a note on its scientific specific epithet. I am grateful to Desmond Meikle for the meaning of the adjective which I could not find in the several Greek dictionaries at my disposal. – BERNARD VERDCOURT, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB.

The Harlequin ladybird *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae) as prey of *Pholcus phalangioides* (Fuesslin) (Arachnida: Aranae). – This common spider lives unobtrusively in corners between ceiling and wall. Potential prey, on touching the silk scaffolding, are quickly wrapped in silk. On completion of the meal, the silken shroud is cut free.

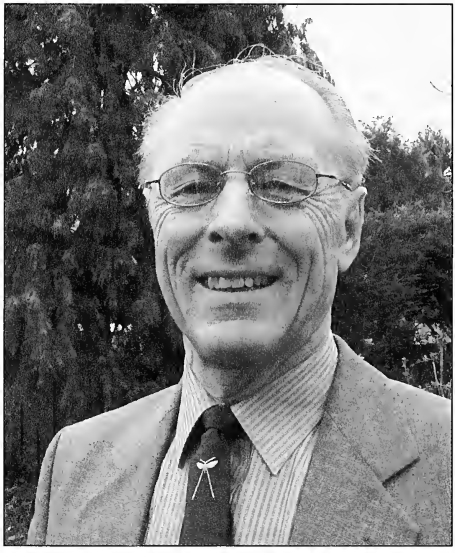
Harlequin ladybirds started entering the house during October 2006 and on 7 November a discarded trussed specimen was discovered. No evidence of feeding was found and the reflex blood had seeped through the silk. On 8 November, a female *Pholcus* was observed apparently feeding, on a wrapped ladybird for at least 12 hours, the beetle being discarded by the following morning. Extensive reflex bleeding had occurred. Any toxins in the ladybird had no acute effect, the spider was not only performing its agitated dance on disturbance but was found feeding on a second ladybird the following day. Feeding continued for at least four hours before the prey was discarded. Subsequently a second female was observed feeding on a *Harmonia* ladybird and up to 7 January 2007 a further four discarded meals were found.

How does such a bulky insect become and remain trapped long enough to become a meal? Is *Pholcus* immune to any toxins contained in the beetle and are other ladybird species acceptable as prey? – D. W. JENNER, Kennaways, Ospringe, Faversham, Kent ME13 0HA.

A guide to the adult caddisflies or sedge flies (Trichoptera) by Peter Barnard & Emma Ross (2007). 48 colour photographs. This recent AIDGAP test key to the families of British caddis is available free on request from the Field Studies Council.

SOCIETY NEWS

Rob Parker, BENHS President 2006–2007



Once again, the Society has chosen an amateur lepidopterist with a military background as President. Here is some personal background on the chap – that's me.

My early fieldwork began in the postwar bombsites of west London, along with school friends who had an eye for bugs. When I found myself patrolling the pavements of Shepherds Bush looking for Privet Hawk larvae droppings, I knew I was hooked. Further inspiration came from the study group at the Natural History Museum; fortunately close enough for regular Saturday visits.

My mother says that I sold my collection only when I discovered girls, and there was indeed a gap of some years whilst I joined the Royal Air Force, learned to fly, married and generally got on with life. I flew mostly Victors, Canberras and Jet Provosts as a flying instructor. A staff posting to Cyprus was the trigger for buying a new net and resuming my interrupted hobby. Just before I left this country, I met a fellow with a net, and that night Tony Harman sat me down in the light of his moth trap, gave me guidance on studying butterflies, and told me to join the BENHS. My three season stay on the island (1973 to 1975, spanning the Turkish invasion) was a stimulating time, and I learned a lot from other entomologists like George Thomson and Otakar Kudrna, who expanded my horizons and encouraged me to publish. Back in Britain, I rushed my specimens to Russell Bretherton and Graham Howarth for proper determination. *The Butterflies of Cyprus* broke new ground by publishing distribution maps for the island, based on my own records and existing literature, but was not finally published until 1983.

I was lucky enough to enjoy further overseas tours with my family in Germany, and then Air Attaché appointments in former Yugoslavia and Hungary. Naturally I took every opportunity to visit interesting habitat, meet local lepidopterists, to learn the European butterflies and to collect. Through the Society, and because of his knowledge of the butterflies of the Middle East, I met Torben Larsen and was much influenced by his witty accounts of collecting in far-flung places. My interest broadened to other Mediterranean islands, but only loosely to other orders of insect, and over the years, visits to Crete, Corfu, Corsica, Rhodes and Kefalonia were the source of lighthearted articles for the AES Bulletin.

My own travels often kept me away from BENHS activities, but I have fond memories of meetings at South Audley Street during my time at the Ministry of Defence. It always seemed likely that I would be able to play a greater role in retirement (and now the Secretary has caught up with me!).

We settled in Suffolk, at the end of a 37-year RAF career, following my final tour of duty as the Senior RAF Liaison Officer with the US Air Force HQ at Mildenhall. Since then, I have enjoyed belonging to the Suffolk Naturalists' Society, walking a local butterfly transect, chairing the Suffolk Branch of Butterfly Conservation, and acting as Butterfly Recorder for the county. My efforts are now focused on the conservation of insects, as well as study. I maintain my collection, but have ceased to add to it, and have taken to digital photography as a modern-day substitute. My early role in mapping Cyprus butterflies has now been assumed by Eddie John's website, a benefit of technology that allows me to be a relaxed contributor.

For the past five years, I have been part of a harmonious collaboration between Naturetrek and Butterfly Conservation, leading their butterfly tours to the Dolomites. I lack the traditional string of letters after my name, and have never discovered an insect new to science, but I look forward to making a worthwhile contribution to the affairs of the Society.

BOOK REVIEWS

***Psocids. Psocoptera* (Booklice and barklice) (2nd edition) by T. R. New. Handbooks for the Identification of British Insects Vol. 1. Part 7. 1–146.** Soft-bound. ISBN 0 901546 84 4. Published for the Royal Entomological Society by the Field Studies Council, Shrewsbury.

I first became properly aware of Psocoptera in August 1979 when I found an *Ectopsocus* in my sweep net while working in Cornwall, and, rather than just tip it out as one of the many unrecognised insects present, I took it home and puzzled over it. I can't remember quite what it was about the tiny thing that made me keep it for closer investigation but it led me to Tim New's previous Handbook on the British Psocoptera, published in 1974. I found the identification key relatively easy to use and I soon identified the specimen as an *Ectopsocus briggsi* – I later discovered that this species was first found by C.A. Briggs at Lynmouth in Devon in 1899 and subsequently described as new to science by R. McLachlan later the same year. It was clearly of very restricted occurrence at the time but is now one of the commonest insects on trees and shrubs throughout the country. J.V. Peters had however already found a very similar but different species in the genus to be widespread in Ireland during July 1976 and which was subsequently described as *E. petersi*, new to science, by Courtney Smithers in 1978. So, the first Handbook was already out-of-date when I first started using it! Unfortunately my original *Ectopsocus* has not survived to reveal its true identity. Interestingly, both species now appear to be equally widespread across Britain – are they accidental introductions which have been gradually expanding? We don't know.

Six other species have also been recognised as occurring in Britain since *E. petersi*, and so a second edition of the Handbook bringing all of these into the identification keys, is very welcome. Of course, we have had the *Faune de France* volumes to keep us going, and particularly the latest and excellent volume 83 – *Psocoptères Euro-Méditerranéens* by Charles Lienhard (1998), but a key in one's native language is always much easier to use of course.

This Second Edition is an entirely new edition, with many additional features. A useful innovation is the inclusion of a section on field identification and recognition. The new keys are in the very clear and easy to use AIDGAP format, but

unfortunately have a number of shortcomings and a few typos. A key irritation is that wing illustrations are referred to without any indication of the diagnostic features which categorically identify the species – an arrow indicating those features would help enormously. Such arrows are one of the strong-points of other AIDGAP style identification works and it seems very odd that they were not better used in this new Handbook. They do feature from time to time but the illustrations are more commonly left without such aids and the reader is left with a 'spot the [significant] difference' quandary. Charles Lienhard has already provided a detailed listing of problems with the keys (2006 *Systematic Entomology* **31**: 729–730) and this won't be repeated here. The availability of this new Handbook has stimulated the launch of a Barkfly[1] Recording Scheme, with Bob Saville as Organiser, and it is intended that corrections to the keys will be featured on a new web-site linked to the Recording Scheme.

The free-living species feed on micro-organisms encrusting surfaces. In the case of trees, the surfaces may be the bark or the foliage. As with the lichens which share their bark habitat, it has been suggested that some may be good indicators of old growth conditions. Other species live in the field layer, amongst grasses and reeds, for example, and tend to be found in long-established and relatively undisturbed native vegetation. This all suggests that they deserve more attention from entomologists involved in site evaluation for conservation. Barkflies deserve to be better known and it is hoped that this new Handbook will bring them to a wider audience.

KEITH N. A. ALEXANDER

Bumblebees by John Feltwell (2006). 59pp. Wild Matters: Battle, East Sussex, UK. £9.99 plus £2.99 postage and packing. ISBN 0-907970-03-6.

Bumblebees have grown in popularity in recent years as their plight has become recognised by naturalists, the general public and the conservation movement. Now various books, magazines and catalogues suggest how gardeners and others may help bumblebees.

So what is special about John Feltwell's book, privately published? Certainly the presentation is very attractive. The style is gentle for those who want to discover more about bumblebees and how to help them. To me it seems ideal for gardeners and those on a gentle stroll in the countryside, helping one to enjoy looking at these friendly insects. It gives pictures and notes on the species that one is most likely to meet, which is the entry level that many people will find sufficient.

The author is a keen photographer so it is not surprising that there are plenty of colourful pictures of bumblebees as well as their look-alikes, plus flowers and some habitat pictures. Anyone with a camera suited to take close-ups will be tempted to follow suit (many ordinary digital cameras can get close). There are lists of bumblebee wildflowers and garden ones. The range of information is fine, bearing in mind that this does not pretend to be an all embracing identification guide nor a mini-text book on the biology and life history. For its niche, this little book deserves to be popular.

ALAN STUBBS

[1] Psocoptera have long been known as book-lice and the outdoor species as bark-lice, but they are not true lice and the new term barkfly has been chosen as a more useful common name.

Fly by Steven Connor. 222pp. 2006. Reaktion Books Ltd. ISBN-13: 978 186189 294 2. Soft back, numerous colour pictures. £12.95.

Many dipterists might overlook a book written by a professor of modern literature, but *Fly* is a fascinating little volume, informative because of the imaginative breadth of material used to reflect mankind's attitude to the flies that have shared our lives for millennia. Steven Connor tackles the fly as our familiar, quoting poetry equating man and fly, rapturously celebrating their co-tenancy, adding observations by Pliny and Plutarch, lines from Shakespeare and less charitable thoughts from *The Lord of the Flies*. Egyptian hieroglyphics describe the award of large flies cast in gold or silver to soldiers exhibiting indomitable spirits, and Homer praised the warlike qualities of the fly. Humanists, dramatists and artists through the centuries are quoted and illustrated in a most readable style that follows strands that sometimes track scientific logic, or other times, simply intrigue the reader. Satan's lieutenant Beelzebub appears just once in the Old Testament, but fly-borne disease was sufficiently well known for there to be a Roman God Myigarus, to protect against flies. The text is interspersed with fascinating illustrations showing Hottentots adoring an endemic fly believed to bring Grace and Prosperity, of flies getting stuck in honey (from Aesop's Fables), of a fly crawling titillatingly across a lady's alabaster flesh (from a Dutch Master) and a selection of public health propaganda posters, one warning us: "the fly is as deadly as a bomber". If you want to read about Spanish Fly, or how the Marquis de Sade used *pastilles de Richlieu*, you will have to read the book.

This is a compact work of scholarship, well researched and well referenced, both from entomological and literary standpoints. I commend it to any reader whose view is broader than a microscope tube. I have not read any of its companion volumes, but they include the titles Ant, Bee and Cockroach.

ROB PARKER

ANNOUNCEMENTS

The new format Royal Entomological Society Handbooks series

The British insect fauna is considered by many to be the best known in the world- a legacy of over 150 years of collecting and publishing. Among a wide variety of available guides to the insect fauna the Royal Entomological Society (RES) has, for the past 50 years, contributed to the identification literature by publishing its Handbooks series – or "Handbooks for the Identification of British Insects" to give the full title. A wide range of titles has been produced over the years, together with checklists ('Kloet & Hincks') to the British Insect Fauna. The flow of published new titles has diminished somewhat over the past few years and the Handbooks have looked rather 'old-fashioned' – especially in comparison with many new continental guides. It was clearly time for a review of the current Handbooks series and a new look at their format – and this review was greatly encouraged by Mike Claridge during his RES Presidency.

The two most recent Handbooks to appear have both been produced in collaboration with the Field Studies Council, whose expertise in publishing the AidGap series has greatly benefited the Royal Entomological Society. A Handbook Steering Group has been formed to assist the process of commissioning and encouraging prospective authors for both Handbooks as well as checklists.

Inevitably some Handbooks have become out of print, or very outdated as a result of other recent work, while others are out of print and yet still very much used for identifications. The Royal Entomological Society is obviously not the only entomological publisher and part of the review considered the gaps in coverage between those groups publishing on different groups.

Those who have seen a copy of the new Psocoptera volume (the first in the new format) will see a resemblance to the successful and effective Field Studies Council (FSC) AidGap series. Handbooks are encouraged to be an introduction to the biology of the group being covered. A checklist of British species will be provided. The approach to identification and keys will be flexible but in general the layout of the keys should allow for drawings to be given adjacent to each couplet (and some drawings could be used more than once). Instead of species being treated within each couplet (as in the old format) they are treated separately after the keys. Prior to publication draft Handbook keys will be encouraged to be tested by potential users, in a more limited way to that which happens to FSC AidGap keys. This might be achieved at a workshop – perhaps at one given by the British Entomological Society in their regular series. Perhaps the only real difference between the two series is that the Handbooks might be considered more 'monographic' and 'authoritative' in treatment. But at the same time the emphasis in both series is to reach an accurate identification and provide information in the best way possible. The general appearance is larger than existing Handbooks in order to give more flexibility in the layout of keys, and the front cover will have a colour photo of a living insect. Colour plates are also likely to feature in new volumes where the use of colour benefits the ease of identifications.

Further to the publication in the new format of the 2nd Edition of Psocoptera by Tim New, there are at present the following Handbooks in various stages of production:

Fleas (2nd Edition) by Amoret Brandt
Beetle Larvae by Michael Cox *et al.*
Carabid beetles by Martin Luff
True Weevils (Part II) by Michael Morris
Lonchaeid Flies by Iain MacGowan & Graham Rotheray
Scraptiid beetles by Brian Levey

All of these should be published during next year. The Carabid volume will have 20 full colour plates featuring all British genera and subgenera. Others are in various stages of preparation and will ensure a steady flow of new volumes and revisions in the coming years.

MIKE WILSON
Handbooks Editor

Barkfly recording scheme

The first UK Barkfly (Psocoptera) Recording Scheme has been launched through the Biological Records Centre (BRC). The barkflies are the wild relatives of the booklice, and occur mainly in trees. The Scheme has been launched following the recent publication of a new Handbook to the identification of species in Britain by T. R. New, published by the Royal Entomological Society.

The Scheme Organiser, Mr Bob Saville, is the data manager at the Lothian Wildlife Information Centre, but has specialised in this group of insects in his spare

time. He has also contributed the the up-to-date Psocoptera checklist to the NBN Species Dictionary Project which allows all the currently known species to be entered on the Recorder database. Records from the scheme will be stored at the Biological Records Centre (for details see www.brc.ac.uk/schemes/barkfly/homepage.htm) and made accessible via the NBN Gateway. He is very keen to receive specimens and records of Psocoptera from anywhere in the UK and Ireland. This is an exciting time to get involved with five species new to Britain having been recorded since 1998 and there is every chance that other species are waiting to be discovered. His contact details are:

Mr Bob Saville, c/o/ Lothian Wildlife Information Centre, Caretaker's Cottage, Vogrie House, Vogrie Country Park, Near Gorebridge, Midlothian EH23 4NU. E-mail: info@ lothianwildlife.co.uk

FIELD MEETINGS

Whipsnade Wild Animal Park, Dunstable, Bedfordshire, 7 May 2005

Leader: **Paul Waring.** – This was one of those events where a great deal of effort went into the planning, there was a large turn-out, the on-site facilities were excellent but the great British weather let us down on the day and the entomological results were scant as a result. This is how it went. The leader, on behalf of the British Entomological & Natural History Society, accepted the gracious offer by Whipsnade Wildlife Park to host a field meeting following the hugely enjoyable and

Fig. 1. Whipsnade, chalk grassland, 7 May 2005. Some of the party L–R Bernard Nau, Sheila Brooke, Anona and Graham Finch, Len Winokur and Paul Waring. Note the sward heights.

entomologically successful meeting at London Zoo in 2004 (see *BJENH* **18**: 149–152). The leader's original intention was to hold the meeting jointly with the Writtle College Club for Overseas Students, and the early date of 7 May was selected to suit the students college work and to avoid the period of revision for summer term exams. However, the Club pulled out after the meeting had been advertised in the BENHS field meetings programme, with insufficient notice to reschedule the date, so we were stuck with it. The aims were to investigate the woodlands on this large country estate, some of which are considered ancient, and all of which are almost unexplored for most groups of insects, although Emily Brennan has provided the leader with a substantial list of moths compiled in 1972 and 1973. There are also some extensive areas of rough chalk grassland with considerable invertebrate potential on a south-west facing scarp slope which was notified with SSSI status in 1989 (Fig.1). This chalk area is known to support populations of the Small Blue *Cupido minimus* (Fuess.) and Chalk-hill Blue *Lysandra coridon* (Poda) butterflies and Glow-worms *Lampyris noctiluca* (L.). Facilities provided by the park included a cafe which provided hot meals at lunch-time, sandwiches for the evening, and coffee etc the following morning, easy and close access for getting vehicles and generators close to light-trapping sites for those wishing to sleep overnight in their cars, ample power points around the site so that many locations could be light-trapped without the need for generators, provision for sleeping under cover on camp beds in some of the zoo buildings and free admission to see the collections of exotic animals and the captive breeding programmes for which the Park is world famous. In addition the event also provided a platform for the interested public to see BENHS members at work.

We had a day-time and an evening session, commencing at 14.30h and 19.30h respectively, meeting at the Park entrance. As often happens early in the season, there was a large turn-out of entomologists keen to get to grips with field-work after the winter and early spring. Eleven members of the BENHS attended, some of whom were also members of the Bedfordshire Natural History Society, to whom the event had also been advertised as the Park is on their patch. An additional 14 people attended, who were either entomologically-inclined members of staff at the Park or were family and friends of the others. Consequently, there was a great social and party atmosphere throughout all phases of the meeting, both outdoors and in. The problem was that the weather on the day was bitterly cold with a stiff wind. Consequently, there were hardly any insects flying. Allan Lawson managed to find and identify four species of Diptera in flight – the Bee fly *Bombylius major* (L.) at bugle *Ajuga reptans*, and the syrphids *Eupeodes luniger* (Meigen), *Melanostoma scalare* (Fabr.) and *Platycheirus albimanus* (Fabr.); seven species of Hymenoptera – *Andrena nitida* (Müller), *Bombus hortorum* (L.), *B. pascuorum* (Scop.), *B. vestalis* (Geoff.), *Melecta albifrons* (Forst.), *Nomada goodeniana* (Kirby) and *N. marshamella* (Kirby) – the first four at bugle and the remainder flying over common nettle *Urtica dioica.*, two common ground beetles by searching under logs – *Nebria brevicollis* (Fabr.), *Pterostichus madidus* (Fabr.) and the common weevil *Phyllobius roboretanus* Gred. by sweeping nettle. Charles and Pat Baker added another individual of the bee *B. vestalis* by the sunken way near the Bison pen. Bernard Nau and Sheila Brooke managed a reasonable list of Heteroptera, mostly widespread and common species but including the more local *Cyphostethus tristriatus* (Fabr.) from Lawson's Cypress *Chanaecyparis lawsoniana* (Murray) and *Orius laticollis* (Reuter) from rowan *Sorbus aucuparia*. The only moth larvae the leader managed to beat in the wind were a few caterpillars of the Winter moth *Operophtera brumata* (L.) and the Early Moth *Theria primaria* (Haw.) about 1cm in length from common hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. A Holly Blue *Celastrina argiolus* (L.) was the only

butterfly seen. There were numbers of one or more species of bibionid flies on the wing on the chalk scarp and a single individual of the adelid moth *Adela reaumurella* (L.) was noted on the edge of woodland. It was observed that the understorey within the woods, at least near the animal collections, had suffered somewhat from browsing by various beasts.

The night was also cold and clear, with an air temperature at dusk of 8°C quickly falling to a minimum of 4°C. Light-traps were provided by the leader, plus Graham and Anona Finch and Len Winokur and these were set up in or near various stands of trees or more extensive woodland. The total list of macro-moths for the night was seven species, mostly as singletons and comprising Nut-tree Tussock *Colocasia coryli* (L.), Lunar Marbled Brown *Drymonia ruficornis* (Hufn.), Chocolate-tip *Clostera curtula* (L.), Hebrew Character *Orthosia gothica* (L.), Common Quaker *O. cerasi* (Fabr.), Brindled Pug *Eupithecia abbreviata* Stephens and V-Pug *Chloroclystis v-ata* (Haw.), with only two to four moths per light! On the positive side the weather was dry all night, there was plenty of time to talk and tell stories of past mothing expeditions, those of us that over-nighted slept well in the accommodation provided, the leader's 5-year old daughter thought the wallabies free-ranging through the Park were great, even if they did appear to have over-grazed the chalk grassland, and we had plenty of time to enjoy the zoo animals. The leader resolved to organise another meeting at the Park in 2006, later in the summer, in an attempt to ensure warmer weather.

The leader thanks everyone who attended and supported this meeting, including staff members Trevor Moxey, Roger Catchpole, Emily Funnell (now Emily Brennan), Kevin Frediani, Paul Pearce-Kelly and Jamie Graham, and also Ken and Elena Major who joined us to see insect recorders at work. We thank the Wild Animal Park and the Estate for hosting the meeting and look forward to another in 2006.

Leighton Moss RSPB reserve, Lancashire, 1 April 2006

Leader: **Paul Waring**. – This field meeting effectively coincided with the real start of spring in 2006. After lower than average temperatures in February and March, with weeks of prolonged dull weather, followed by heavy rain in some places in late March, the last couple of days of March were sunny and mild and in stark contrast to what had gone before. When the leader, his wife Rachel and daughter Kirsty departed from their home in Peterborough, Cambridgeshire, on 31 March for the journey north to attend the field meeting, common frogs had only just started spawning in the garden pond. One of the five clumps of spawn was still compact and all had appeared within the previous 48 hours. Spawn usually appears in this pond in the second week of March (e.g. 8 March 1993, 13 March 1994, 8 March 1995, by 17 March 1996, 15 March 1997). At our journey's end we also found frogs producing spawn at the pond by our overnight accommodation at Greenthorne Farm House, Yealand Redmayne, just to the east of Leighton Moss. During the journey we saw our first butterfly of the year (another indication of the late spring). This was a single male Brimstone *Gonepteryx rhamni* (L.) flying in sunshine along a hedgerow by the A17 road at the Stragglethorpe junction, Lincolnshire, just east of Newark, Nottinghamshire.

In preparation for the field meeting, to increase the numbers of moths available to be examined by those attending, the leader operated a single Robinson trap from

Fig. 1. Leighton Moss RSPB reserve.

dusk until dawn at Greenthorne Farm House (SD 502 757) on the night of 31 March, on a large grass lawn behind the farmhouse, with exotic conifers present in the boundaries, looking out towards native broad-leaved woodland, mainly of oaks and birch. The total catch of moths comprised eleven individuals of seven species: Common Quaker *Orthosia cerasi* (Fabr.) (3 individuals), Oak Beauty *Biston strataria* (Hufn.) (2), Grey Shoulder-knot *Lithophane ornitopus* (Hufn.) (2) and singletons of the Yellow Horned *Achlya flavicornis* (L.), Herald *Scotiopteryx libatrix* (L.), Pine Beauty *Panolis flammea* (D. & S.) and Hebrew Character *Orthosia gothica* (L.). The weather on the night had been rather favourable in comparison with earlier in the month. It was calm with full cloud cover, a dusk temperature of 9°C falling to a minimum of 6°C during the night, with a little late rain. The leader was pleased to see a barn owl fly over him while he was setting up the moth trap just before dusk.

After a morning visit to nearby Silverdale and Warton Sands on Morecambe Bay in cold windy conditions, devoid of insect activity, the Leighton Moss RSPB reserve slightly inland proved much more sheltered and warmer (Fig.1). The start time for the field meeting, which had been advertised to the Lancashire Moth Group as well as the BENHS, was 3pm for the afternoon session, reconvening at 7pm for night work. The date of the meeting had been chosen mainly to coincide with the "booming" of the resident bitterns and the flowering of the sallows and willows on this 130 hectare RSPB reserve which consists of shallow pools, reed-beds, marsh, carr-woodland and scrub. The reserve contains the largest area of reed-bed remaining in north-west England. A system of board-walks allows access to most parts of the reserve and we made plenty of opportunities to spend time in the various

hides viewing the bird-life which includes bearded tit, harriers and many species of ducks and waders. The leader had made arrangements for a guided tour of the reserve during the afternoon, led by local RSPB volunteers Jane and Mike Milpas, and for sleeping overnight with camp-beds, carry-mats and sleeping bags in a special on-site Education Room with toilets, and in the hides. We also enjoyed local fish and chips with hot beverages in the RSPB tearoom in the evening and ample cooked breakfasts there in the morning.

The meeting was attended by a total of ten adults and six children and the leader is delighted to report that almost all of us overnighted on the reserve, which was an exciting, unusual and memorable event for the children, and some of the adults too, including night-time exploration of the reserve by starlight and torchlight. Six of the adults were members of the BENHS and/or the Lancashire Moth Group. We were supplemented by Dr Rebecca Ellis and her party from the "Amateurs as Experts" project at Lancaster University (see *BJENH* **19**: 266–267), including children Holly, Mila, Rosie, Selina and Mathilda.

Literally as we entered the reserve for the afternoon exploration we heard a male bittern boom several times from amongst the reedbeds. For most of the party this was the very first time they had ever heard a bittern. Jane Milpas informed us that the bittern had only started booming properly a couple of days previously, which was another indication of the late spring. No butterflies were seen all afternoon although apparently 31 species have been recorded on the reserve in recent years. The sallows were also late blooming; of at least a dozen examined by the board-walks, we only found one with some fully opened catkins. These were attracting a few feeding flies by day. None of the shrub species were in leaf for beating for larvae and we found none of the blackthorn in flower. Instead, we watched a male marsh harrier quartering the reedbeds. At one point a female flew up from amongst the reeds and collected a prey item from the male. Again, we were informed that the male had only arrived at the reserve the previous Saturday, followed by two females during the week. We also heard the song of the first chiff chaff of the year for this site. He had begun singing that morning. Sand martins were arriving and increasing in numbers through-out the day. During the afternoon we found several common toads on the move to water for mating, and more after dark, including a couple in amplexus at 21.15h, on and around the board-walks, by torch-light, which amused the children. Only one moth, a Common Quaker, was seen visiting the sallow catkins, eyes reflective and appearing to glow in the torch beam, but this at least demonstrated to the children that "sallowing" works. In the evening we listened to woodcock roding as well as the male bittern booming. It is clear from research by the RSPB that bitterns prefer shallow water, about 20cm deep, within the reedbeds, where they can hunt eels that can move easily through such reed-beds, with both species benefitting from the cover. Our male was certainly booming from such an area. These are not features of ancient reed-beds, which silt up with debris and reed-litter and they can be created in a matter of a few years. The RSPB are currently working to increase the area of such habitat in Great Britain (e.g. see *BJENH* **18**: 278–285), where only about 20 pairs of bitterns breed currently. At Leighton Moss suitable habitat is maintained by periodic rotational dredging and control of water-levels and in 2005 the bitterns had a good breeding season, with two nests of youngsters, including one brood of four successfully reared (Keith Briggs, pers. comm.).

Three 125W Robinson MV light-traps were operated all night in the carr woodland near to the Visitor Centre (SD 477 749), it being too early in the year for the reed-dependent moths, but the night was colder and clearer than the previous one at Greenthorne Farm. Only five species of moths were seen in the traps when we

inspected them before bed and again in the morning: the Common Quaker (7), Hebrew Character (3), Oak Beauty (2), March Moth *Alsophila aescularia* (D. & S.) (1) and Early Grey *Xylocampa areola* (Esp.) (1), with no trap containing more than six moths or four species. Newsletters from moth groups around the UK and web-sites were reporting similarly low catches at this time (see *British Wildlife* **17**: 360). The leader was pleased to be able to exhibit the additional species captured at Greenthorne Farm and the selection kept the children and the photographers busy sketching and photographing them until the bacon and eggs were ready! Afterwards the moths were released and we reluctantly divided up for some long journeys home, wishing we could stay longer to explore more of this beautiful area.

The leader would like to thank the RSPB both for permission to hold this event and for their considerable logistical support, including warm accommodation (Jacqui Fereday, Visitor Centre Manager), hot meals including full cooked breakfasts (Gill Saunders, Tearoom Manager), advance liaison (Robin Horner, Site Manager, and Jen Walker, Publicity & Visitor Officer) and guided tour of the reserve (Jane and Mike Milpas). Also thanks to Stephen Palmer of the Lancashire Moth Group for advertising the meeting to the group and for their support on site, and to everyone who attended and made it such a pleasant social field event so early in the year. He especially thanks Keith Briggs for attending and sharing his observations with us. Keith has known the site and the bitterns since the early 1960s.

Manstage Farm, Thorndon Cross, Devon, 13 May 2006

Leader: **Roy McCormick**.–Despite the poor weather conditions (it had been raining with what looked like more of the same to come) 10 people came to this event. The owner Richard Hulls (a former professional entomologist) had raised the Union Flag on the corner of his lane as promised, but he was on his way out as we arrived. Because of the conditions, it was decided we would run our traps near to the vehicles in case a downpour ensued; fortunately we only had light drizzle which did not go on for long, but it still damped down all the vegetation which made it impossible to flush species out without getting soaked. Eight traps were put out by four of the people present, but we did not hold out much hope of recording many species, which turned out to be correct; we eventually produced a list of 27 including mines of *Stigmella aurella* (F.) found by Barry Henwood and Bob Heckford. The rest of the list was lacklustre with the best moths of the night being, 1 *Watsonalla cultraria* (F.) (Barred Hook-tip) and 2 *Lomographa bimaculata* (F.) (White-pinion Spotted). Needless to say, we did not stay very long leaving the site by around midnight.

Bishopstone Glen, Kent 11 June 2006

Leader: **John Badmin**.–This meeting was held jointly with the Kent Field Club to provide records for Buglife's UK Soft cliffs Survey. The area is known mainly for its aculeates such as the nationally scarce (Nb) digger wasp *Alysson lunicornis* (Fabr.) and the cuckoo bee *Nomada fucata* Panzer (Na), a cleptoparasite of the mining bee *Andrena flavipes* Panzer. The day proved to be extremely hot and as a result we finished soon after lunch. Quite a large number of people attended and before we left the car park, Laurence Clemons had already recorded a RDB ulidid fly *Dorycera graminum* (Fabr.). Although fairly restricted in Kent, the fly proved to be quite common in the area.

Many butterflies were seen wandering over the tumbling cliffs, mostly widespread species. There were strong colonies of Meadow brown, Small heath, Common blue

and Narrow-bordered 5 spot burnet *Zygaena lonicerae latomarginata* (Tutt), now a rather local species. Orthoptera noted were: *Conocephalus discolor* (Thunberg), *Leptophyes punctatissima* (Bosc), *Pholidoptera griseoaptera* (Goeze), *Chorthippus brunneus* (Thunberg), *C. parallelus* (Zetterstedt) and *Tetrix undulata* (Sowerby). It was nice to see the red and black froghopper *Cercopis vulnerata* Illiger and the large leafhopper *Eupelix cuspidata* (Fabr.). Lots of bees were in evidence including the bumblebees *Bombus hortorum* (L.), *B. lapidarius* (L.) and *B. rupestris* (Fabr.). Many nest holes of solitary bees were found on the south-east/south facing walls of Bishopstone Glen, confirming it as one of the most important breeding sites for Hymenoptera along the north Kent coast. Several species were swept including a large dark bee and forwarded to Geoff Allen for identification. We recorded a total in excess of 100 invertebrates during our brief visit. We returned via the shore where Judith Shorter spotted a large number of sea gooseberry *Pleurobrachia pileus* (Müller) washed up along the shore line (and still in the sea according to the bathers).

Challacombe Farm, Devon, 17 June 2006

Leader: **Roy McCormick**.– The night promised to be dry and clear with an easterly breeze which kept temperatures down. There was a good turn-out of 15 people (mostly members of the Devon Moth Group), with one member and his family camping overnight in one of the farmer's fields. The Challacombe Farm family, our hosts, were very keen to learn what moth species were present on the farm and surrounding moorland. Fourteen traps were operated. Four of us set up our traps on the moorland with the other two using the farmer's fields; a road dividing the two sites. A bit of dusking brought one very worn Lead Belle, *Scotopteryx mucronata* ssp. *umbrifera* (Heydemann) to our nets, but little else of note as the breeze kept most species down. Things looked up once we started our generators, with the early arrival of the swifts, with both sites recording a good number of Map-wing Swift, *Hepialus fusconebulosa* (DeGeer) and the commoner geometers which included plenty of Oblique Carpet, *Orthonama vittata* (Borkhausen). Subsequent rounds brought in more goodies with Double Line, *Mythimna turca* (L.) and Silver Hook, *Deltote uncula* (Clerck) turning up on the moorland site. By the time a couple of rounds had been completed the night was getting quite cold with temperatures falling to around 10°C. The camping family kept their lights running all night, along with the other member who stayed on the farm site and slept in his vehicle, but little else appeared. Those of us that were not staying packed our lights up by around 00.30h having recorded 73 species on the moorland site and 61 species from the farm site, with the best of these: 11 *O. vittata* from both sites; 2 *Sphinx ligustri* (L.) (Privet-hawk moth) from the farm site; 1 *Diacrisia sannio* (L.) (Clouded Buff) from the farm site; 2 *Lacanobia contigua* (D. & S.) (Beautiful Brocade) from the farm site; 4 *M. turca* from the moorland site; 8 *D. uncula* from the moorland site and 2 *Schrankia costaestrigalis* (Stephens) (Pinion-streaked Snout) from the moorland site. All in all, not a bad night considering we were in the middle of Dartmoor.

Farnell Farm, Rolvenden, Kent 18 June 2006

Leader: **John Badmin**.– This joint meeting with the Kent Field Club was held on an exceedingly hot summer's day, with members of our own society turning up from as far north as Northampton and York. The visit to Farnell Farm was arranged with the owners, Mr and Mrs Craddock, by Dan Tuson of the Kent Rural Development Service. The farm comprises a mixture of coppiced and managed woodland and open

grassy fields on mainly acidic soils. Heather occurs sporadically in the south and is being encouraged to proliferate to form heathland through a process of clear felling. It is a tricky process, as felling too large an area at anyone time allows bramble and bracken to flourish to the detriment of heather. The plant is obviously well adapted to the area and develops into tall (1 m high) bright green bushes if given a chance.

Dominique Collins proceeded to record thrips using a small white beating tray on which to observe these small, highly active insects. Not surprisingly he found many individuals of *Limothrips cerealium* Haliday, an ubiquitous grass feeder, more commonly known as the 'thunder bug'. He recorded *Ceratothrips ericae* (Haliday), a well-known *Calluna* specialist from heather as well as one male of *Drepanothrips reuteri* Uzel. This latter species was a new county record. This thrips normally feeds on *Quercus* and *Corylus* and presumably had dropped down from the trees above. It is a local species in the UK, having been recorded from southern England and Scotland, but few places in between. Additional species were: *Aptinothrips rufus* (Haliday), *Chirothrips manicatus* (Haliday), *Frankliniella intonsa* (Trybom), *Thrips brevicornis* Preisner, *T. fuscipennis* Haliday, *T. major* Uzel, *T. vulgatissimus* Haliday and *Haplothrips juncorum* Bagnall, 11 in total. Voucher specimens have been deposited in the collection of the Central Science Laboratory, Sand Hutton, York.

Bumblebees were present in reasonable numbers, the most abundant being *Bombus lapidarius* (L.), *B. terrestris* (L.), *B. lucorum* (L.) and *B. pascuorum* (Scopoli). Two worker hornets were also seen. Several Orthoptera were recorded – the bush-crickets *Meconema thalassimum* (De Geer), *Leptophyes punctatissima* (Bosc), and *Pholidoptera griseoaptera* (De Geer), the Meadow grasshopper *Chorthippus parallelus* (Zetterstedt) and Common groundhopper *Tetrix undulata* (Sowerby).

Leafhoppers included the bright green *Cicadella viridis* (L.), *Eupteryx stachydearum* (Hardy), *Iassus lanio* (L.), *Alebra viridis* (Rey), *Aphrophora alni* (Fallén), and *Anoscopus albicans* (L.). The planthopper *Ditropis pteridis* (Spin.) was recorded from bracken. No leafhoppers, psyllids or bugs were recorded from heather despite the lush foliage and it was thought this might be because the newly created patches were relatively isolated from other areas of heathland in Kent and Sussex and that appreciable colonisation had yet to take place.

Laurence Clemons recorded a RDB tachinid fly *Gymnosoma rotundatum* (L.) soon after our arrival. The snipe flies *Rhagio tringarius* (L.) and *R. scolopaceus* (L.) were regularly seen and at lunchtime a smallish specimen of the local parasitoid fly *Phasia hemiptera* (Fabr.) settled very close to us so we could admire it.

The day was completed by chasing a couple of tiger beetles *Cicindela campestris* L. along the wooded trackways.

BOOK REVIEW

Time to Stare: wildlife in a corner of Britain by Ray Armstrong (Grice Chapman Publishing, Norwich, 2005). 144pp, 144 colour photographs. Soft cover £19.95. ISBN 0-9545726-6-1.

The author has compiled a stunning collection of colour photographs of the animals that occur in the Trellech Plateau and neighbouring Wye Valley region of Monmouthshire. A flip through the book is a wonderfully refreshing experience as each photo reminds you of the beauty of nature. The accompanying text is largely generic with conservation overtones. Sadly, for members of this journal, most of the book is devoted to vertebrate predators of insects (i.e. birds and bats) with relatively few portraits of insects themselves apart from the usual mix of butterflies and moths. Thus more than 70% of the animals that occur there are excluded. That said, just enjoy the photographs, they are superb. JOHN BADMIN

ANNOUNCEMENT

Moths Count and the National Moth Recording Scheme – an update

The Moths Count project, which will develop the National Moth Recording Scheme, is now officially up and running, having been launched by Sir David Attenborough on 2 May 2007. The project has had a long gestation and there has been a substantial gap between the extensive consultation phase in 2003/04, in which many moth recorders participated, and the launch. Therefore, we wanted to take this opportunity to update moth recorders on progress. The project would not have succeeded in gaining the necessary funding if it had not been for the enthusiastic support of moth recorders during the consultation and development phases. We are very grateful for this support.

The four-year project aims to achieve more than the development of a National Moth Recording Scheme covering the macro-moths in the UK, Isle of Man and Channel Islands, although this remains a core part of Moths Count. It is also about raising awareness of moths and moth recording (e.g. through a public moth survey *Garden Moths Count* in June), recruiting and training new moth recorders and supporting existing ones.

Moths Count is a partnership of many national and local organisations, businesses and individuals, led by Butterfly Conservation. The British Entomological and Natural History Society is an important partner in Moths Count, having contributed both funding and other support, and it is represented on the projects' Steering Group. A team of five people has been recruited to run Moths Count: Richard Fox (Project Manager); Les Hill (Database Manager); Zoë Randle (Moth Recording Co-ordinator); Susan Anders (Outreach Officer) and Sarah-ann Boon (Project Assistant). The team is based at Butterfly Conservations' Head Office at East Lulworth, Dorset.

Although efforts to raise awareness of moths and challenge the negative public perception of these wonderful insects may be of interest to some active moth recorders, the National Moth Recording Scheme element of Moths Count will be of prime interest to most. The enthusiasm and expertise of moth recorders will be vital to the success of the National Moth Recording Scheme. The project has been built upon the views and concerns of moth recorders, gathered during the consultation and planning phase and discussion and feedback will continue as the National Moth Recording Scheme takes shape.

Since there is already a huge amount of moth recording taking place, the new scheme should work with that effort, harnessing additional useful information from moth records with minimum extra work for recorders. Thus, the National Moth Recording Scheme will be developed around the existing system of County Moth Recorders, who already provide vitally important roles of collating, verifying and, in many cases, computerising moth records. The project team will work to support moth recorders, local groups and County Moth Recorders to ensure that there is a viable network across the UK. The creation of a National Moth Recording Scheme will encourage all moth recorders to submit their records, via their County Moth Recorder, to a central database of moth distribution records. The resulting 'national' dataset is likely to be one of the largest in the world! So please continue to (or start to) send your moth records to your County Moth Recorder. In the future, the project will look to develop online recording as a way of increasing participation, reducing the burden of data input

and providing useful tools to moth recorders, as well as helping to ensure that the new recording scheme is sustainable in the long-term.

During 2007, we plan to start collating existing local and national datasets of moth records. These will provide an essential historical background against which to measure change and define conservation priorities, as well as recent records. The National Moth Recording Scheme database will also provide a rich source of information for research into a range of ecological questions, including the impact of climate change and the links between declines of moths and their predators such as birds and bats.

The National Moth Recording Scheme will not be a 'black hole' for records. The records will be used to provide feedback, stimulate further recording, extend knowledge of moths and support conservation and research. The central database, and a range of other information about moths, will be made available (at a defined resolution that will need to be agreed by consensus) to moth recorders and others through a dedicated project web site (*www.mothscount.org*) and the National Biodiversity Network Gateway. Provisional distribution maps of each moth species will become available online, as more and more data are added, providing rapid, positive feedback to participants, as well as essential information to encourage and guide further recording. In addition to these 'live' maps, we will produce a provisional atlas at the end of the project (both online and as hard copy). A long-term aim, outside the scope of this project, will be to publish an atlas of the larger moths of Britain and Ireland.

Feedback and useful information for moth recorders is an integral part of the project. In addition to provisional maps, information about the project and about moths will be disseminated via a wide range of publications and media coverage, as well as face-to-face meetings. National conferences are being held to offer moth recorders a chance to hear more about the project and input their own ideas. Successful conferences have already been held in Scotland and Wales early in 2007, and ones are being planned for England and Northern Ireland later in the year. Moths Count is also organising free training workshops for new and existing moth recorders (see *www.mothscount.org* for details). Some of these are aimed at people new to moths, with the aim of recruiting new recorders, but others provide opportunities to learn about rare or scarce species, or to learn new skills such as genitalia dissection, which may be of interest to some active recorders. As the project develops, further training opportunities will be provided for existing moth recorders.

Moth recording has never been more popular and there is lots of fantastic work being undertaken by moth recorders and local groups across the UK. With your support and participation, the Moths Count project and, in particular, the National Moth Recording Scheme, will add great extra value to this work and provide useful information and facilities to moth recorders and conservation organisations alike.

If you have other questions or would like to join the project mailing list, please contact Sarah-ann Boon 01929 406009 or *saboon@butterfly-conservation.org*, or visit the Moths Count web site *www.mothscount.org* – ZOË RANDLE & RICHARD FOX, Butterfly Conservation, Manor Yard, East Lulworth, Wareham, BH20 5QP

URGENT REQUEST FOR MEMBERS' EMAIL ADDRESSES

We would like to add email addresses to the Society's membership database. We hope this will speed our communications with you and reduce costs. If you have an email address please email to the Hon. Secretary (jmuggleton@aol.com) and put 'BENHS email' in the subject box. It would help us if you could also indicate whether you would be happy to receive Society notices etc. at this email address.

Sheppey insect records request

The Kent Field Club and the Kent & Medway Biological Reocrds Centre will be holding a conference on the 'Natural History of the Isle of Sheppey' on Saturday 13th October, 2006 at Canterbury Christ Church University, Kent. If members have any interesting insect records from the island, please contact the convenor John Badmin. The proceedings will be published as a book

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